SITUATIONAL MOTIVATION AND ACHIEVEMENT-TEST PERFORMANCE OF HOPEFUL AND FEARFUL PUPILS

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THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN EDUCATION
IN THE GRADUATE COLLEGE OF THE
UNIVERSITY OF ILLINOIS, 1959

URBANA, ILLINOIS

UNIVERSITY OF ILLINOIS

THE GRADUATE COLLEGE

September 9, 1959

I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY Khossrow Mohandessi

ENTITLED Situational Motivation and Achievement-Test Performance of Hopeful and Fearful Pupils

BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF Doctor of Philosophy

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D517

ACKNOWLEDGMENT

The author wishes to express his gratitude to Professors J. Thomas Hastings, Chairman of his Doctoral Committee, and Lee J. Cronbach, member of the Committee, with whom he had close contact during the various phases of this study. The encouragement and the guidance provided by the former, as well as the unparalleled patience he manifested on several occasions, and the penetrating comments and insightful suggestions of the latter on different points helped make this study possible.

The author feels also indebted to the other members of the Committee --Professors Glenn M. Blair, Norman E. Gronlund, Lloyd G. Humphreys, and T. Ernest Newland--for all that he has learned from them in the course of this study and, prior to that, in the course of his graduate work at the University.

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CHAPTER ONE: INTRODUCTION AND STATEMENT OF THE PROBLEM

The question of the effects of motivational factors on learning and performance has long interested psychologists of many different backgrounds. No less interested in the research findings regarding the relation between motivation and performance or demonstration of ability and achievement are educators and educationists who, by virtue of their profession, are incessantly looking for guidelights which could lead them to improving teaching-learning situations.

It is quite unfortunate, therefore, that most of the studies done in this area are not directly comparable to each other. Even more disturbing is the fact that different studies point to apparently conflicting or contradictory conclusions. Several factors are responsible for this happening. Each investigator has his own point of departure and employs particular definitions and concepts of motivational factors under investigation. The method and design of investigations are often so different from one experiment to the next that any direct comparison of the outcomes is a virtual impossibility. Then, of course, there are the differences among the instruments used and the universe of stimuli and responses being sampled. All this makes the goal of the student who is in search of some degree of consensus regarding the important aspects of the problem, more or less, unattainable.

In the section to follow some of the studies which are more closely related to the problem of this paper will be reviewed briefly. It was decided to include only those studies in this section which had either theoretical significance or practical implications for the kind of design, instruments, and the task, etc. employed in this study or else contained answers to some of the questions which could be anticipated to be asked by those who would be interested

in the study. Thus, although some ordering and organizing has been attempted in reviewing the literature in Chapter One, the tie between various studies cited may not be very clear at points. This, however, does not seem to be a serious problem as long as the studies reported meet one of the above-mentioned criteria.

Achievement Motive, Learning, and Performance

Motivational factors, in the broader sense of the term, can be divided into two distinct categories. The first category consists of those factors which are inherent in the individual or internal to him. Such factors are, more or less, general and stable elements of personality. This group of factors determines "the individual's typical level of motivation," (French, 1955). Their origin, as suggested by Friedman (1950) and explained by McClelland (1951, pp. 341-352 and 441-458; 1953), can be traced to early childhood and the training given the child by his parents during that period. Atkinson (1957, p. 360) defines such a motive as "a disposition to strive for a certain kind of satisfaction," or "a capactiy for satisfaction in the attainment of a certain class of incentives." He further states (1958, p. 597) that "the aim of a particular motive is a particular kind of effect to be brought about through some kind of action."

A second group of motivational factors consists of those elements in a given situation which cue off motivational responses of a particular kind in the individual. Obviously such factors are external to the individual and may act either to raise or to lower his typical level of motivation to perform certain tasks. Atkinson (1958), among others, has suggested that we call the first group of factors, i.e., those internal to the individual, motives and reserve the term motivation to designate all the factors falling in the second category of our classification. Total motivation, then, becomes a function of motive and motivation. Performance of a given individual in a given situation on a given

task is obviously a function of both the situational factors and the internal motives.

Some of the first studies of a motive called need for achievement (n Ach) as a variable influencing learning and performance were conducted by McClelland (1953) and his associates. They further investigated some of the correlates of achievement motive and gave examples of cases where achievement motive was experimentally aroused and the way it affected learning behavior and performance of groups of subjects on various types of tasks. It should be pointed out that the n Ach index used in a great majority of these and the succeeding studies was the one developed by McClelland et al (1953) or a close adaptation of it. Unless otherwise specified, this is the measure employed in the studies which follow.

Lowell (1952) investigated the relationship between achievement motive and performance on a Scrambled Words Task. He found that the group with high n Ach scores showed a regular increase in their output from the first to the fifth four-minute period, suggesting a learning curve in their case, whereas variations in output for the low n Ach subjects did not display any consistent trend. The mean gain in output was significantly greater for the high n Ach group.

Wendt (1955) corroborated Lowell's finding with regard to the relation between n Ach scores and amount of output and the quality of performance. The task he used consisted of arithmetic problems of a special kind.

Karolchuck and Worell (1956) investigated the effects of need for achievement on both directed and incidental learning. The learning task they used was an adaptation of a James Thurber short story with which the subjects had no familiarity. They defined the directed learning as the particular kind of learning which was expected to take place as a result of the particular set induced in the situation. The incidental learning, on the other hand, was considered to be a learning which was irrelevant to the induced set. As was

predicted, high n Ach individuals showed a greater amount of incidental learning than individuals with low n Ach scores. Karolchuck and Worell failed, however, to substantiate Lowell's (1952) finding with regard to the effects of need for achievement on directed learning. They attribute this discrepancy in findings to the unclear composition of the n Ach index suggested by McClelland (1953) and his associates, and recommend a re-examination of the index in order to determine the nature of the component variables and to provide for their control.

Morgan (1953) investigated the relationship between n Ach scores and school grades as a criterion of achievement. He found that, in general, there exists a low to moderate relationship between n Ach scores and grades in school. The subjects of his study were Junior boys in academic and vocational high schools. The correlations between n Ach and IQ scores range all the way from low to high (.03 to .73, N = 39 to 62), and there is, naturally, a substantial positive relationship between IQ scores and grades. The relationship between n Ach and grades, though somewhat reduced, still holds when intelligence is partialled out.

Another important finding which Morgan reports concerns the stability of n Ach scores over a short period of time. He had two forms of the Picture-Interpretations Test which he administered to Ss five weeks apart. The correlations for the scores obtained from the administration of one form and those obtained from the administration of the other to the same Ss were .56, .56, and .64 indicating that n Ach scores are fairly stable over a short period of time. Morgan interprets these reliabilities as demonstrating that "n Ach score may be considered a measurement of an enduring personality trait just as the initial experimental studies of McClelland et al (1953) showed that n Ach score reflects temporarily induced motivational states."

McClelland et al (1953) also checked the relation between achievement motivation and grades. Their sample consisted of 30 Wesleyan University students, most of them WWII veterans. The correlation between n Ach score and

average grade for the semester during which the test was taken and the two succeeding semesters was .51 which is significant beyond .01 level.

Lowell (1952) checked to see whether the high and low n Ach groups differed in intelligence. The measurements available were ACE Psychological Examination scores. The high n Ach subjects had significantly higher Linguistic Scores on the test. In order to check the validity of the possible explanation that the differences in the amount of output and the quality of performance between high and low n Ach groups were due to differences in intelligence, he computed partial correlations between n Ach scores and increase in output from the first to the fifth four-minute period on the Scrambled Words Task, holding the Linguistic Score on the ACE constant. He found that the significant relationship between n Ach and increase in performance output still held. There was no relationship between n Ach and the Quantitative Score on ACE. Atkinson and Reitman's (1956) study corroborates these findings.

French (1955) has shown that both initial level of achievement motive and the situational motivation aroused by verbal instructions produce significant differences in the performance of Ss. She also found that the interaction between initial motivation and induced motivation was not significant. That is, efforts to increase or decrease motivation experimentally did not override the initial level of motivation. She found that Ss with high scores on the first test, i.e., when no motivation was induced experimentally, tended to have high scores on the second test, i.e., when motivation was aroused through verbal instructions, and that Ss who scored low on the first test, also scored low on the second test. She interprets the findings as suggesting that "an independent measure of motivation and a knowledge of the characteristics of the stimulus situation are both essential for predicting performance."

Thomas (1956) showed that a subject's n Ach score was related to the length of time he continued to work on a problem without receiving any

feedback on the amount of progress he has made toward a correct solution. French and Thomas (1958) tested the hypothesis that n Ach is related to success in obtaining a solution for the problem as well as to the length of time spent working on the problem. They found that although the number of Ss who reached a correct solution and those who failed to do so was about equal in high n Ach groups, the ratio was only one to three for the low n Ach Ss. This difference is significant beyond the .05 level. The difference in the length of time spent working on problems was also significant in the predicted direction. The investigators also showed that the relationship between n Ach and problem-solving effectiveness was not due to the relation between motivation and length of time spent on problems since actual solution time for those who succeeded in obtaining a correct solution was not different for the high and low motive groups.

Atkinson and Reitman (1956) found that in the Achievement-Orientation condition the performance of the high n Ach group was significantly superior to that of the low n Ach group both on number of solutions attempted and on number of correct solutions. They showed, furthermore, that the relation between performance and the strength of a particular motive holds only if a single motive is aroused in the individual and the only reason for acting is to satisfy that motive. When an act is overdetermined, i.e., when several motives such as achievement, affiliation, power, etc. are simultaneously aroused in the same person, the relation between performance and the strength of any one of the motives disappears. Performance, in other words, is no longer a function of the strength of that one motive but of the several different motives aroused at the same time. Ss were male college students in an introductory psychology course.

French (1958) tested the hypothesis that the more difficult, and the less interesting, the task the greater the relation between achievement motivation and performance. She found that the hypothesis was supported for task difficulty but reversed for task interest. That is, the relationship between performance

and n Ach scores was more salient in the case of difficult tasks than in the case of easy tasks. The reversal of the relation between achievement motive and task interest is attributed to the markedly poorer performance of the low motivation Ss on the interesting task. The explanation suggested is that the interesting task may have provided goals other than success for the low motivation Ss which interfered with their performance.

Anxiety, Learning, and Performance

Much interest has been expressed in the problems of anxiety and its effects upon learning and performance during the last decade. A great deal of effort has been put into exploring the field and the number of studies carried out have been numerous. Nonetheless, due to conceptual confusion and lack of a central theory which binds together the outcomes of various research studies, there is very little in the field that one can generalize about.

At least two main theories of role of anxiety in performance and learning situations can be distinguished. Proponents of one theory, known as the Iowa group, tend to emphasize the drive characteristics of anxiety. They maintain that anxiety adds to the total drive and increases the reaction potential of all the responses ordinarily evoked in a situation. Since reaction potential is a multiplicative function of habit strength and drive, an increase in drive will have a greater effect on those responses which have greater habit strengths than on those which are weaker in this regard.

With regard to learning, Montague (1953) explains the position in these words:

> "When incorrect tendencies are strong and numerous in comparison with correct, as in a complex verbal learning situation, anxious subjects might show a relative decrement in performance as compared with non-anxious Ss. In a situation where few and weak incorrect tendencies are elicited by a task, as in the usual eyelid conditioning task, anxious Ss would show comparatively superior performance."

An alternative explanation of the function of anxiety in learning and performance is offered by Mandler and Sarason (1952a, 1952b, 1952c, and 1953) and their associates. They maintain that anxiety can serve as a drive-stimulus which may elicit competing responses, facilitating responses, or both. These two types of responses are respectively designated as "task-relevant" and "task-irrelevant" responses. Either of them can reduce anxiety. One may learn the proper responses to an anxiety-inducing stimulus and thus be able to reduce his anxiety by coping with the situation in a direct fashion. Or, he may employ various defense-mechanisms (task-irrelevant responses) which will also reduce his anxiety. This latter type of response, however, is not conducive to learning and, as a matter of fact, interferes with it.

The difference between the two positions can be clarified by the hypothetical example which follows. Suppose an individual performs a task when he is not anxious, and performs the same task some other time when he is anxious. The Iowa group would say that in the second situation drive properties of anxiety produce a greater reaction potential in the person for all the responses already present in the first situation. Mandler and Sarason, on the other hand, would emphasize that anxiety has drive-stimulus properties of its own and is capable of eliciting new responses which in turn may either interfere with or facilitate the performance.

We may note in passing that each of these two groups have developed and used, rather consistently, their own instrument for measuring anxiety. The Iowa group has used the Manifest Anxiety Scale (MAS) developed by Taylor (1953). Mandler and Sarason (1952a, 1952b, and 1952c) have been concerned for the most part with the type of anxiety produced in testing situations. The instrument they have developed has been referred to, more than any other name, as the Test Anxiety Questionnaire (TAQ). They have also developed a Generalized Anxiety Questionnaire which has been used less widely than the TAQ.

Before turning to a brief discussion of some of the studies investigating the relationship between anxiety, on one hand, and learning and performance of various types of tasks, on the other, we would like to emphasize the oft-neglected distinction between personality anxiety and situational anxiety. Just as it was true of achievement motive, personality anxiety is reflective of or inherent in the individual's personality structure whereas situational anxiety has its roots in the situation and is instigated by external factors. The former indicates a predisposition to anxiety and possesses some degree of generality over different types of situations. The latter, on the other hand, is rather specific and varies from situation to situation according to the stimulus properties of the elements making up the situation.

Montague (1953) studied the role of anxiety on serial rote learning. His study is a good illustration of the position of the Iowa group. He found that high anxiety subjects were superior to low anxiety Ss when learning an easy task but were inferior to them when learning a more difficult task. Montague explains this finding in terms of drive properties of anxiety of the high scorers which increases the reaction potential of the incorrect tendencies for the hard task. But he also recognizes the alternative explanation in terms of new, mediating responses elicited by anxiety as a drive-stimulus.

Nicholson (1958) failed to find a significant interaction between anxiety and task difficulty as reported by Montague. But he found a significant interaction between anxiety and instructions. This finding can more readily be accounted for in terms of the emphasis given by Mandler and Sarason to the responses evoked by anxiety as a drive-stimulus. Under task orientation, where anxiety was kept at a minimum, the high and low anxiety groups performed similarly. Under ego orientation, however, where anxiety was aroused, the task-irrelevant responses interfered with performance of high anxiety subjects whereas the task-relevant responses improved the performance of low anxiety groups.

Findings of other studies such as those reported by Ramond (1953), and Spence (1954) are consistent with the results Montague (1953) has obtained indicating that there is an inverse relationship between quality of performance in complex learning situations and the degree of anxiety as expressed on the Taylor scale. These studies, furthermore, demonstrate that the advantage of the non-anxious group over the anxious Ss is positively related to the number and strength of the competing responses which are likely to be elicited as a result of an increase in anxiety.

Spielberger, Goodstein, and Dahlstrom (1958) investigated the relationship between drive level (measured by MAS) and performance on the recall of a graded series of visual-motor tasks when no instructions to learn were given. They found a highly significant interaction effect between anxiety and task difficulty. The difference in performance between high and low anxiety Ss on the hard task was also significant while the difference between HA and LA groups on the easy task approached significance at .10 level.

Anxiety and Intelligence. Several studies have been made of the relation between anxiety and intelligence. The interest stems from the fact that if intelligence is correlated with anxiety, the explanation ordinarily given for superior performance of high anxiety subjects on simple tasks--as reported for example by Montague (1953), and Taylor and Chapman (1955)--and the relatively poorer performance of high anxiety subjects on complex tasks--as reported for example by Farber and Spence (1953), Montague (1953), Ramond (1953), and Taylor and Spence (1952)--should be considered in a different light. Grice (1955) has suggested that the inferior performance of high anxiety subjects could be as readily attributed to differences in intelligence as to differences in level of anxiety.

There are a number of studies, however, which have failed to find a relationship between anxiety and intelligence. Included in this group are studies of

Klug and Bendig (1955), Dana (1957), Mayzner et al (1955), Sarason (1956), and Schulz and Calvin (1955). These studies seem to support the conclusion of Farber and Spence (1955, p. 10) who state that they have "been unable over a period of years to find any relation between the Anxiety Scale scores of college students and conventional measures of intellectual ability such as entrance examination scores and grade point averages." Most of the studies referred to in this paragraph have used the Manifest Anxiety Scale as the instrument with which to measure anxiety.

As a check on the effect of intelligence on their findings, Spielberger et al (1958) compared the ACE Psychological Examination scores available for high and low anxiety Ss. The mean ACE for the high group was 124 and for the low group 119 which clearly is a nonsignificant difference. The correlation between ACE scores and the total recall scores for these Ss was also insignificant.

Calvin et al (1955) found no relationship between MAS scores and IQ scores as measured by Wechsler Bellevue Intelligence Test in a group of college students of both sexes whose range of IQ was 102-141 with a mean of 122.75 and SD of 9.18. When they added a second group of subjects with lower IQ scores (range 92-129, mean 108.3, and SD 10.41) the combined groups yielded a highly significant negative correlation between IQ and anxiety scores.

Spielberger (1958) tested the hypothesis advanced by Schulz and Calvin (1955) that the inconsistency among the findings of various studies regarding the relationship between intelligence and anxiety is due to the fact that these studies have often used different selection criteria or procedures. He found that the correlation between MAS scores and ACE Psychological Examination scores for the total sample, and for the total males and total females in his sample were not significantly different from zero. In case of male subjects, however, he found that the size of the obtained correlations were related to the mean ACE

scores of the subsamples. As the mean ACE for a subsample increased the extent of the negative correlation between the MAS and ACE decreased.

Spielberger's conclusion is that, "a small negative correlation between anxiety and intelligence may be found in male college Ss if one samples a wide range of intelligence and if the sample contains a sizeable proportion of Ss in the lower part of the range." (p. 223) This relationship, however, disappears when the sample does not include enough cases from the lower ranges of ACE. It should be noted that Spielberger's subjects were college students whose range of ACE is already restricted as compared to high school subjects. Hence, smaller negative correlations.

Psychological Stress and Increase in Anxiety. There are a number of studies available in the literature in which psychological stress (defined as telling the subjects that they have failed to achieve adequate standards on an intelligence test) has been employed to increase Ss' anxiety. Two of these are the studies by Lucas (1952) and Gordon and Berlyne (1954). In both instances the performance of anxious Ss under stress was significantly inferior to that of the anxious group tested under neutral conditions. The performance of non-anxious Ss under stress, however, was in one case the same and in the second case superior to that of the control group under neutral conditions. Taylor (1956) sees some resemblance between the explanation suggested for these findings by Hullian' (1943) theory of drive and that based on the position taken by Sarason, Mandler, and their associates (1952a, 1952b, 1952c, and 1953) with regard to the role of anxiety in learning situations.

Taylor (1958) tested a prediction of the drive theory that under neutral conditions HA group will perform at a higher level than the LA group when the task involved is one with minimum competing intratask responses. The hypothesis states, furthermore, that introducing psychological stress into the performance situation would result in HA Ss increasing their margin of superiority. She

found that under neutral conditions the HA group exhibited the superiority in performance predicted by drive theory. The stress condition lowered level of performance of both the HA and LA groups. Both of these differences were significant at a satisfactory level of confidence. The interaction between (personality) anxiety and psychological stress, however, was not significant as predicted by the drive theory hypothesis. That is, although the stress condition had the effect of interfering with performance, the HA Ss maintained their margin of superiority they had demonstrated under neutral conditions.

As a result of their survey of the field Lazarus, Deese, and Osler (1952) came to the conclusion that:

> "The great majority of the studies of stress and verbal performance show deterioration or impairment as the results of the experimental conditions." And, "the general picture of the effects of stress upon perceptual-motor performance is similar to the pattern found with verbal tasks. A large number of studies have shown impairment of perceptual-motor performance under stress."
>
> "In connection with experimental studies of the effects of stress upon performance, many qualitative changes in behavior have been noted. Stereotyped responses, inattention, disorganized activity, and increased overt activity have been some of the aspects of behavior under stress that have been observed. Many experimenters have reported signs of emotional upset such as sweating, tremor, subjective anxiety, pulse changes, etc."

Gaier (1952) studied the relationship between several personality variables and the learning process. The personality characteristics, including anxiety, were inferred from test protocols of the Rorschach ink blot test. He found, among other things, that "anxiety readiness" was negatively related to general level of performance on tests of scholastic aptitude. On comprehensive examinations anxiety correlated positively with the part calling for rote recall, and negatively with parts calling for analysis of familiar materials, for comparisons of familiar and unfamiliar materials, and for critical evaluation of new materials. Ss were members of a Social Science I class at the University of Chicago.

Mandler and Sarason (1952a) found that anxiety did not necessarily depress scores but could also serve to improve them. Low anxiety subjects were superior to high anxiety subjects on the first five trials of a Block Design test. As the learning process continued, high anxiety subjects tended to improve their performance. The variability of the high anxiety group was significantly larger than that of the low anxiety group. A report of success or failure improved the performance of the LA group but depressed scores for the HA group.

Gordon and Sarason (1955) investigated the relationships between "test anxiety" and "other anxieties." They found that test anxiety and generalized anxiety, as measured by two different questionnaires, were linearly related to one another. A product-moment correlation between "test anxiety" and "generalized anxiety" was +.468 which, considering the sample size on which it was based, was significantly different from zero. The correlation, though not large enough to account for most of the variance, supports the hypothesis that anxiety in a testing situation is significantly associated with anxiety in a variety of other situations. Ss were Yale College students in an introductory psychology course.

A minor finding of the study which will be of interest to us later on is the negative relationship between test anxiety and attaching importance to intellectual and professional accomplishments--an index of need for achievement.

Sarason et al (1958) observed the behavior of high and low anxiety children in classroom situations. They report behavioral differences between HA and LA girls suggestive of need for achievement. In the case of girls there were 11 HA and three LA Ss whose behavior suggested a strong need for achievement whereas in the case of boys there was no difference between the numbers of high and low subjects who manifested such behavior. At the time the observations were made the children were in grades 2 to 5.

A Two-Factor Theory of Motivation

On the basis of experimental findings and theoretical considerations several authors have proposed a two-factor theory of motivation. The names given to these two classes of motives vary according to the author but the underlying assumptions or principles on which such a classification is based are almost identical among those suggesting such a position.

The most general designation for the two types of motives would probably be approach vs avoidance tendencies. Distinctions have been advanced also between appetites and aversions, pleasure-seeking and pain-avoidance, hopes and fears in the writings of Murray et al (1938), Mowrer (1950), and Tolman (1951).

Atkinson (1957) has distinguished between the two classes of motives by comparing and contrasting the aims and purposes which each class serves. He writes:

> "The general aim of one class of motives, usually referred to as appetites or approach tendencies is to maximize satisfaction of some kind....
>
> "The aim of another class of motives is to minimize pain. These have been called aversions, or avoidant tendencies. An avoidance motive represents the individual's capacity to experience pain in connection with certain kinds of negative consequences of acts." (p. 360)

McClelland (1951) has also advocated a two-factor theory of motivation. He states that there might be two types of motives characterized, respectively, by approach and avoidance behavior. He further states that the antecedents of pain-avoidance and pleasure-seeking tendencies can both be found in early childhood. For the former group of dispositions which include motives such as rejection-avoidance motive, failure-avoidance motive, etc., he suggests the term "fear" and defines them in terms of the particular kinds of punishing consequences that are to be avoided, e.g., fear of punishment, fear of rejection, fear of failure, etc. By the same token the latter group of motives, i.e.,

the approach dispositions, which include motives such as achievement, affiliation and aggression can be called "hopes."

In the area of achievement motivation the dichotomy of "hopes" and "fears" was first suggested by McClelland and Liberman (1949), McClelland (1951), and McClelland et al (1953). They proposed to distinguish between an achievement motive which is characterized primarily by "hope of success" and one which is characterized primarily by "fear of failure." The suggestion was based partly on theoretical principles and partly on the experimental findings which showed significant differences in performance of high, middle, and low n Ach groups on tasks of various kinds. According to McClelland et al (1953) the factor which determines whether a person is primarily a "hope of success" or a "fear of failure" person is "whether achievement cues in the past history of the individual have been primarily associated with negative or positive changes in affective level."

On the basis of the data available from several studies, McClelland et al (1953) suggested that individuals scoring in the middle ranges of n Ach distribution might be said to be primarily concerned about failure and be bothered by anticipation of failure. This suggestion was somewhat modified later on in the light of results obtained from more recent experiments. The position most widely accepted by various authors at present is that the two groups which score at the extremes of n Ach distribution are respectively motivated by fear of failure and hope of success.

McClelland (1951) showed that the TAT stories of men presumably motivated by hope of success contained achievement imagery with positive anticipations of the goal (Ga+) while men presumably motivated by fear of failure wrote stories containing achievement imagery with negative anticipations of the goal (Ga-).

McClelland (1951) also found that "fear of failure" individuals inhibit the recall of tasks failed and are slow in recognizing the tachistoscopic

presentation of achievement-related words connoting failure, obstacles to achievement, etc. "Hope of success" Ss, on the other hand, are especially quick in recognizing achievement-related success words and show none of the defensive characteristics of the "fear of failure" group. He notes, furthermore, that there are other behavioral indications which lend support to assuming such a dichotomy in achievement motive.

McClelland (1956) has shown that there are two kinds of diametrically opposed tendencies in choice of level of aspiration in children of kindergarten and third grade age. The classical level of aspiration experiment--the ring-toss experiment--was repeated with the five-eight-year old children. Nonverbal indices of need for achievement were also obtained for the same Ss. In both instances the high n Ach groups set their level of aspiration in the intermediate range of difficulty more frequently than the children who were low in n Ach. The latter group had their choices at the two extremes of difficulty.

Clark, Teevan, and Ricciuti (1956) have presented results with college students comparable to those of McClelland. Immediately before students took a final examination in a college course they were asked questions regarding the grade they expected to receive, how they would feel about receiving certain grades, and what grade they would settle for if they were excused from taking the exam. The subjects were put into one of the three groups: hopeful of success, fearful of failure, and intermediate on the basis of indices derived from responses given by them. Need for Achievement scores were also obtained for Ss. The results showed that the intermediate group, i.e., Ss whose settle for grade fell somewhere in the middle range between the maximum grade they thought they could possibly make and the minimum grade they thought they might possibly drop to, had significantly higher n Ach scores than the two groups who set their level of aspiration either too high or too low.

Mahone (1958) has done a similar study in a quite different area--vocational aspiration. His purpose was to show that the fear of failure in college students is a determinant of unrealistic vocational aspiration. His findings clearly support the major hypothesis of the study. That is, on each of the four criteria of realistic-unrealistic vocational aspiration significantly more "fear of failure" subjects were classified as unrealistic than Ss considered to be motivated primarily by "hope of success." When ability was controlled statistically, there still remained a significant relationship between fear of failure and three of the four criteria of realistic-unrealistic vocational aspiration.

Mahone's findings are in accord with the theory of risk-taking behavior advanced by Atkinson (1957) and McClelland (1958) that a fearful person, when setting his level of aspiration, should prefer speculative ventures where his probability of success is quite low or safe ventures where probability of success is quite high. He should, in other words, tend either to over-aspire or to under-aspire in relation to his demonstrated task performance and ability. Persons who are relatively weak in motivation to avoid failure as compared to their motivation to achieve success, on the other hand, should tend to prefer ventures where probability of success is intermediate.

McClelland (1951), and McClelland et al (1953) had originally suggested that "hope of success" and "fear of failure" be considered two aspects or components of achievement motive. In other words, their "general theory of motivation states that there should be two kinds of achievement motivation, one characterized primarily by fear of failure and the other by hope of success."

More recent formulations, however, use the achievement motive synonymous with hope of success and consider the fear of failure a different motive. Atkinson (1957), for example, states that, "the achievement motive is considered a disposition to approach success," whereas "the motive to avoid failure is considered a disposition to avoid failure and/or a capacity for experiencing

shame and humiliation as a consequence of failure." He further suggests that "hope of success and fear of failure are to be considered two phenotypically dissimilar alternatives that are genotypically similar. That is, they both function to avoid or reduce anxiety for the person in whom the motive to avoid failure is stronger than the motive to achieve." (p. 366) As will be pointed out later, this is the point of view adopted in the present study.

Statement of the Problem and Hypotheses

The rationale for this study came from the piecemeal fashion in which previous studies had been carried out in this field. As can be clearly seen from the sample of research studies reviewed in previous sections of this chapter, the important motivational variables have been isolated so dangerously in the studies available that it is an almost impossible job to put together the findings of different experiments and make sense out of the scattered bits of information available here and there.

On the basis of experimental findings of various research studies, some of which were reviewed in previous sections of this chapter, as well as the theoretical formulations which were adopted for the purposes of this study, a relatively complex experimental design was set up which would provide an opportunity for systematic investigation of the relationships between several important variables in this area.

The variables chosen for study were those which presumably play an important role in the relation between motivation and performance. These, as will be discussed at greater length later on, included factors such as personality anxiety, situational anxiety, achievement motivation, affiliation motivation, and a condition of no induced motivation, hope of success, fear of failure, and degree of ego-involvement or perception by Ss of the situation which they were in. The purpose was to study these variables independently and in relation to

each other in order to investigate the effects that addition or omission of each factor would have on other variables and on the total picture. A study such as this would, of course, give us checks at several points for the validity of assumptions and hypotheses suggested by various theories of motivation.

The general nature of the questions in mind when planning this experiment can be inferred from the following examples: Is the distinction proposed between "hopeful" and "fearful" individuals a valid distinction in terms of differences in performance that the two groups may exhibit under different motivational conditions? What are the effects of induced (situational) anxiety on performance of Ss from different "motive" backgrounds? Can motivations of various kinds be experimentally aroused in Ss so that their emotional involvement in performing a task will differ from situation to situation? Are there sex differences in the way Ss respond to different motivational conditions? Does an increase in anxiety have the same effect as raising the drive level, i.e., does it result in an improvement in performance? Or does induced anxiety elicit "task-irrelevant" responses which interfere with performance? May it possibly be true that many Ss will do better under conditions of no induced motivation than under conditions when motivational cues are so strong that result in a disintegration or deterioration of performance? What kind of motivational inducement would lead to superior performance by high school students on a school-like task? Etc.

The major hypotheses of the study, however, were limited to only six, considering the rest of the findings exploratory in nature. The major hypotheses were:

Hypothesis I. The motivation to achieve, defined in terms of Ss' responses to a self-rating ego-involvement questionnaire, can be aroused in high school students through verbal instructions and the stated purposes for which the results obtained from their performance on a school-like task would be used.

Hypothesis II. Boys will show a greater degree of ego-involvement in achievement conditions whereas girls will show a greater degree of ego-involvement in affiliation conditions.

Hypothesis III. Performance of subjects who are working under conditions of strong achievement motivation will be inferior to those of Ss who, other things being equal, are performing under conditions of strong affiliation motivation on an arithmetic operations task.

Hypothesis IV. Performance of subjects in a condition of strong affiliation motivation, where great emphasis was put on interpersonal relations, will be superior to the performance of Ss in a condition of no induced motivation.

Hypothesis V. Under neutral conditions, where no motivation is induced externally, "hopeful" pupils will do better than "fearful" pupils.

Hypothesis VI. Under conditions of achievement, where great emphasis is put on attaining a standard of excellence, "hopeful" subjects will do less well than "fearful" subjects.

CHAPTER TWO: PROCEDURE

Two hundred and thirty-eight high school juniors of both sexes were given the Test of Insight, developed by French (1958), and Test Anxiety Questionnaire (High School Form) developed by Cowen (1957). These instruments were used as selection criteria in the present study. All testing was done at Kankakee Senior High School,[1] Kankakee, Illinois, where Ss were regular students during the academic year 1958-1959.

Out of the total group of Ss tested, 79 were selected to participate in other phases of the study on the basis of a predetermined criterion. Four of these students dropped out of school during the time the study was in progress. So the total number of Ss for whom complete data were available at the end of the experiment was 75.

The following sections of this chapter will describe the classification of Ss into various subgroups.

Motive Groups. On the basis of theoretical considerations and findings of various studies, some of which were discussed in Chapter One, it was assumed that two groups of high school pupils with opposing motive dispositions could be identified. One group of pupils, assumed to be primarily motivated by "hope of success" was called the "hopeful" (H) group. The other group, assumed to be primarily motivated by "fear of failure" was called the "fearful" (F) group. The instruments used for making this classification were:

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[1]The author wishes to express his gratitude to Mr. Walter Knecht, then the principal of Kankakee Senior High, and now Superintendent of Public Schools in Kankakee, Illinois, for his interest in the study and his willingness and cooperation in making available his school and students for participation in this study. Thanks are also due to other members of his staff for their valuable assistance in carrying out various phases of the study.

(a) Test of Insight (TI). This instrument, which can be classified as a general projective technique, was developed by French (1958) as a measure of a variety of needs and motives. The scoring categories and key used in this study were those developed for achievement motive. The assumptions underlying the construction of the test are that "individuals with high needs will tend to interpret the behavior of others in terms of those needs, and further, that interpretations of people who expect to be successful will be in goal-oriented terms and those of individuals who fear failure will be in defensive terms."

Two comparable forms are available for Test of Insight with satisfactory validity and reliability data reported for both forms. Form I was chosen to be used in this study primarily because items making up this form were judged to come closer to describing the kind of experiences that a high school student might have.

Each form of the test consists of ten one-sentence items giving a characteristic behavior of a person--a male. Items 1 and 2 of Form I, for example, read, "Bill always lets the 'other fellow' win," and "Ed feels upset if he hears that anyone is criticizing or blaming him." The person taking the test is asked to explain why each man behaves as he does. He is further asked to "decide what this man is like, what he wants to have or do, and what the results of his behavior are apt to be."

In the booklets prepared for this study each item was placed on a different page, rather than placing five items on the same page as was done by French (1958) in developing the test. This was assumed to reduce the danger of interference caused by seeing several items at the same time or of repeating the same statements for several of the items. This minor change in test format was suggested by the fact that the development of the Test of Insight was done on subjects--PreFlight Cadets at Lackland Air Force Base--who were presumably more mature than Ss of this study and could thus control themselves to a greater

extent with regard to looking at several of the items at once, and keep their responses to one item from being contaminated by their responses to other items. The top sheet of a 12-page booklet contained the standard instructions to Ss, with Page 2 reading (in capital letters), "Do not turn the page before the Experimenter announces the time to start." The exact format of the test booklet used in this study can be seen in Appendix A.

A question might be raised concerning the feasibility of using with female Ss test items in the form of visual or verbal cues with only male characters as central figures of the items. Such an objection, however, does not seem well-founded in view of the results of several studies available on this point.

McClelland et al (1953) report similar performances on an anagram test for males and females with comparable n Ach scores. To the extent that superior performance on such a task for Ss with high n Ach scores can be considered an indication of the validity of n Ach index obtained from responses to male pictures, fantasy productions of female subjects, even when written to standard male pictures, can be assumed to be valid measures of need for achievement.

Morrison's (1954) data present another evidence for the validity of n Ach scores derived from imaginative stories written by women. The task he employed was the Scrambled Words Task used with college men by Lowell (1952). Morrison divided his female Ss into those scoring in the top one-third of the n Ach distribution and those scoring in the bottom two-thirds. He found that women with high n Ach scores did consistently better on the Scrambled Words Task than women with low achievement motive scores. There was also a slight, though not significant, tendency for the high n Ach group to show a greater gain from the first to the last four-minute period of performing the task. Since performance scores of women in the high and low need for achievement groups can be predicted with the same degree of certainty as those for male Ss reported by Lowell (1952) and

others, the conclusion seems warranted that n Ach scores are equally valid for the members of both sexes.

As a further indication of validity of n Ach scores for women, Morrison found that the college women who held offices tended to have significantly higher n Ach scores than Ss who were not office holders.

Still another important finding of Morrison's study was that n Ach scores derived from stories written to pictures of career women did not predict performance on the Scrambled Words test. The picture cues had to be of men, or of women in non-achievement situations, if the scores were to be valid indicators of performance.

Atkinson (1958) sums up the present state of our understanding of the validity of female n Ach scores in these words. He writes:

> "The average n Ach scores of American male and female students in high school and college are significantly greater in response to pictures of men in culturally-defined achievement settings than in response to pictures of women in very comparable settings (Veroff, Wilcox, and Atkinson, 1953). Mead (1949) has argued that ideas of achievement are defined out of the female role in our society at about the time of adolescence. The girl begins to realize that trying to achieve puts her in competition with men and elicits a negative reaction from these potential marriage partners. As a result, we should expect that expectations of achievement are stronger, even in women, in response to pictures of men rather than women in work situations." (p. 611)

Although comparable studies with the Test of Insight are not available at the present time, the almost identical characteristics and features of imaginative productions obtained from picture cues and those obtained from verbal cues seem sufficient for generalizing these findings to n Ach indices derived from the Test of Insight.

Since it is widely accepted that the kind of associative material obtained from imaginative stories or other kinds of fantasy productions will be influenced not only by the cues specifically introduced to elicit certain types of responses but also by contextual cues present when the test is administered,

it was considered important to administer the test under "neutral," "normal" conditions where no particular motive of any kind was aroused or depressed in Ss. This would seem to increase one's confidence in the validity of the test for measuring motives as general and stable characteristics of personality. To secure such "neutral, normal" atmosphere, Home Room periods were chosen and Home Room teachers were asked to administer the test. This was considered to be the best alternative among those available in a school situation. The Director of Testing at the school co-ordinated the whole testing program. The test was administered in nine Home Rooms on the same day and during the same period so that there was no possibility of Ss talking to each other about the test and influencing and modifying each other's responses. The average size of the Home Room in which the test was administered was 26 students. The test was presented to the subjects as "a test of insight which measures your understanding of other people."

Figure 1 contains the Guide to Administration which was prepared and sent to school several days before the date set for testing. The Director of Testing discussed the Guide with the teachers involved and gave each a copy.

FIGURE 1. TEST OF INSIGHT--A GUIDE TO ADMINISTRATION

This is a simple projective test made up of 10 items of one sentence each. For this reason there is not too much that can be discussed with the students in the way of orientation, above and beyond the description of the test which appears on the first page of the test booklet. Actually, any information which might give the students an "impression" of what they are expected to write would be disasterous to the validity and usefulness of the information obtained.

The following information can be given to the students at the time they are told that they are going to take the test:

"There have been several attempts at measuring the understanding by a person of other people's behavior. The test you are going to take on February 25 is one such attempt. The name of the test is the "Test of Insight," and it measures your understanding of the reasons behind other people's behavior. Since many

explanations can be given for the same behavior, there are no "right" or "wrong" answers to the items of the test and in this sense the test is somewhat different from other tests that you have taken in school. Your job is simply to give the interpretation which you think best explains the behavior of the person described in each item. I am sure you will enjoy the test."

On the day of testing, the Examiner may refer to the above-mentioned information as a refresher. He then distributes the test booklets and says:

"On the first page you have the instructions you are to follow while taking the test. Read the instructions to yourselves silently while I read them aloud. When we are through reading the instructions, we will have a minute or two for questions from those of you who are not quite clear about the directions. Then, when everybody is ready I will tell you to start on Item 1. Remember that you have three minutes to write on each item. At the end of each three-minute period I will tell you to move on to the next item. When you hear this, turn the page immediately and start on the next item. This way you will have a chance to give your explanations for all items. Try to write during the whole three minutes, but if you happen to finish before the three minutes are up, wait until told to go on."

At this point, the Examiner reads the directions on the first page of the test booklet and answers the questions that students might have. If possible, one proctor should be allowed for each 25-30 students in the room. The main job of the proctors, besides helping distribute the test booklets at the beginning of the testing session, is to make sure that the students follow the announcements concerning the time allowed for writing on each item. There may be other occasions when the proctors can help, such as having pencils ready for those who break theirs.

The main job of the Examiner would be accurate timing of the period given to each item. At the end of each three-minute period he says, "Please move on to the next item." Or, "Shall we go to the next item now." Or, "Start writing on Item Number .... now."

The total time for this testing session is 35 minutes--five minutes for reading the instructions and answering the questions students might ask, and 30 minutes for writing on each of the 10 items. The examiners and the proctors are requested to make a note of any deviations from the procedures outlined here and send it with the test booklets to the investigator.

On the basis of the reports received from Home Room teachers and the Director of Testing, who personally supervised all testing sessions, it can be assumed that the testing went smoothly and there was no deviation from the prescribed procedures which might invalidate the data collected.

Scoring of Test of Insight. French has suggested 13 categories of scoring for the Test of Insight when the test is used to measure need for achievement.

The first step in scoring was to identify all scorable statements in the explanation of behavior written to each item. A scorable statement was considered a statement which as a unit could be assigned to one of the thirteen categories of responses. Six of these categories are positive categories such as "expectation of goal attainment," and "goal directed activity." The remaining seven categories are negative categories such as "defensive statement or rationalization" and "failure to attain goal." In each explanation of behavior or "story" written by Ss each of the categories can be scored only once. The device keeps the verbal fluency of the Ss from affecting the scores they make on the test. A good illustration of this point is provided by McClelland et al (1953). The following two statements both fall in the same category of response and receive the same scores:

(a) "The apprentice feels bad because he didn't make the grade."

(b) "The apprentice, upset and angry, thoroughly disgusted with himself for not being able to perform as well as was required to do the job, goes home and complains to his wife."

Each positive category of response has a value of +1 while each negative category of response has a value of -1. Thus, upon the completion of scoring procedure for each paper a positive and a negative score will be available for each subject. According to the two-factor theory of motivation developed in Chapter One, to the extent that the positive score is larger than the negative score the subject making such a score is a "hope of success" person, or to use the exact terminology of this study a "hopeful" person. On the other hand, to the extent that the negative score is larger than the positive score, the person making such a score is primarily a "fear of failure" person or simply a "fearful" person. Thus for each subject a Total Score was computed by algebraic summation of his positive and negative scores. Table 1 shows the distribution of Total

Table 1. Distribution of the Test of Insight Scores

(N = 220)

Score	Frequency
+13	2
+12	3
+11	2
+10	4
+9	2
+8	3
+7	5
+6	8
+5	12
+4	12
+3	7
+2	15
+1	18
0	18
-1	25
-2	15
-3	14
-4	18
-5	9
-6	7
-7	5
-8	5
-9	3
-10	3
-11	1
-12	3
-13	0
-14	1

Scores for all 220 Ss whose Test of Insight records were complete and could be scored.

French (1956) reports interscorer reliabilities of .88 and .91 for Test of Insight records. In view of this high scorer agreement obtained for the test, it was decided that in the present study scoring could be done by one person, the author, without reducing the reliability of scoring to any considerable extent.

(b) Test Anxiety Questionnaire (TAQ). This was the second instrument used for selection of students with "hope of success" or "fear of failure" as their dominant personality motive. Mandler and Sarason (1952a) developed the College Form of the instrument which has been used in several studies of the relationship between performance (or learning) and anxiety. The High School Form of the instrument was developed by Cowen (1957). It consists of 52 items referring to students' feelings in school testing situations. The students are asked to mark anywhere along a scale continuum which best represents the strength of their feeling about the question asked in the item. Each individual scale has three reference points at the two extremes and at the midpoint. Descriptive phrases are placed at the two extremes so that the probability of Ss having difficulty following the questions or deciding where on the scale they want to mark is greatly reduced.

Due to the fact that the High School Form of the TAQ is only two years old, data concerning reliability and validity of the scale are not, by any means, extensive. For this kind of instrument, however, logical or face validity is the main kind of validity that is required, and this is what the High School Form seems to have--judging from the nature of the items which have gone into making it. Also, if we accept the assumption that the present test is a comparable form of the TAQ College Form all studies of the validity and reliability of that form should be equally applicable to the High School Form. Mandler and Cowen (1958) computed the test-retest reliability of the High School

Form. This estimate of reliability was .90 as compared to a split-half reliability of .91 and a test-retest reliability, also, of .91 for the College Form was reported by Sarason and Mandler (1952b).

On the basis of these considerations the High School Form of TAQ was assumed to have satisfactory validity and reliability for the purposes of this investigation which were, more or less, rough classification of Ss into two groups of high and low anxiety.

Administration of the TAQ was done on the same general pattern as the Test of Insight. The same Home Room teachers and Home Room periods were used for this purpose. The testing was done a week after the TI testing. In order to reduce the probability of faking by Ss, no connection was established between this testing session and that for the Test of Insight. This, plus the fact that Home Rooms are usually periods used for giving tests which are not related to the subject matter taught in classes make the argument plausible that as far as the author was concerned there was nothing in the situation which would have encouraged faking on the part of Ss.

As in the case of the Test of Insight a Guide to Administration was prepared and sent to the school several days before the date set for administering the TAQ to pupils. The Director of Testing discussed the Guide with the teachers involved and gave each a copy. The Guide is reproduced in Figure 2.

FIGURE 2. TEST ANXIETY QUESTIONNAIRE (HIGH SCHOOL FORM)
--A GUIDE TO ADMINISTRATION

This is a questionnaire developed to measure the amount of anxiety students feel while taking scholastic aptitude tests or regular class examinations. For orientation purposes the following information can be given to the students when they are first told of the time and place of testing:

"You are going to complete a questionnaire describing your feelings in test-taking situations. The questionnaire is part of a larger study carried on by the University of Illinois. The University has selected our school as one of the

special schools to participate in the study. So, it is important for us to do our best in carrying out the project and furnishing them with accurate information. The answers you give to the questionnaire items will be treated as strictly confidential by those in charge of the study and no part of it will be made known to any of the teachers or school officials."

On the day of testing, the Examiner can refer to the above-mentioned information as a refresher and then distribute the questionnaire booklets. At this time he tells the students:

"DO NOT open the booklets until I tell you to do so."

Once the booklets are distributed, the Examiner says:

"Will you please take up the first page of the booklet and follow along carefully as I read the instructions aloud. We want to make sure that all parts of the instructions are clear to you and you all know what you are supposed to do."

Then he starts reading the instructions as clearly as he can, emphasizing the underlined words and sentences. After he finishes reading the third paragraph, he stops and uses Item 1 of the questionnaire (on top of the second page) as an example of what the students are supposed to do. He draws a line on the blackboard and writes the phrases at the ends and middle of the line just as in the booklet:

A C B

Work better under pressure — Midpoint — Work better on my own time

He then says, "For example, Item 1 reads: 'When under the pressure of a testing situation, I work better than on my own time.' If student A feels that this statement is exactly true of him, he puts a mark (✓) at point A of the line. Student B might be quite the opposite of A, that is, he works better on his own time; so he puts a mark (✓) at point B at the right end of the line to indicate his feeling which is opposite to that of A. A third student C may work just a little better under pressure than he does on his own time; so he puts a mark (✓) just a little to the left of the midpoint to indicate his feeling. Hence, a mark which indicates your feeling about an item can be put anywhere on the line."

Next, the Examiner goes back to paragraph 4 of the instructions and reads to the end of the page. He then tells the students, "Are there any questions about what you are supposed to do, or is everybody clear on all points?" In case questions are asked, the Examiner can answer them on the basis of this "guide" and the instructions on the test. Once all such questions are taken up and satisfactorily answered, he tells the students to start answering the questions.

The administration time for the questionnaire is 30 minutes, but in case the discussion of the instructions and the answering of the questions take a little longer time than that normally expected, the Examiner should allow everybody to finish the questionnaire.

The presence of 2 or 3 proctors in each room would facilitate administration of the questionnaire, especially for distributing the booklets and answering questions of individual students which may come up in the process of taking the test.

In case someone asks, at the beginning of the testing session, whether he should put his name down or not, the Examiner can say, "We will come to that once you have finished answering the questions."

The Examiner and the proctors are asked to make a note of any deviations from the procedure outlined here and send it, along with the test booklets, to the investigator.

On the basis of the reports received from Home Room teachers and the Director of Testing, who personally supervised all testing sessions, it can be assumed that the testing went smoothly and that there were no deviations from the prescribed procedures which might invalidate some of the data collected.

Scoring of the High School Form of TAQ is done by placing a nine-point scale along the continuum immediately below each item on which Ss have marked their answers. The total score for each subject is the sum of the 48 scores he obtains for individual items. Four of the 52 items in the questionnaire are not scored. These items are fillers and are included in the test only in order to make the transition from one line of thinking to the next more plausible to Ss. The questionnaire items are phrased in such a manner that the "low" or the "high" end of the scale is not always on the same side. This feature of the instrument causes the subjects to re-orient themselves to the high-low ends from time to time.

Table 2 shows the distribution of scores for all 220 Ss tested with TAQ. Table 3 contains the means and standard deviations for these and the comparable normative data reported by Mandler and Cowen (1958). The sample they used consisted of 286 high school sophomores in Watertown, Massachusetts. As can be seen from Table 3, these two sets of data are highly consistent with each other

and in both samples the mean score for girls is higher than the mean score for boys which may be taken as implying that girls show greater anxiety in testing situations than do boys.

Table 2. Distribution of the Test Anxiety Questionnaire Scores (N = 220)

Score	Males	Females	Total
116-135	4	1	5
136-155	2	1	3
156-175	8	1	9
176-195	8	5	13
196-215	16	11	27
216-235	15	20	35
236-255	20	28	48
256-275	18	22	40
276-295	7	11	18
296-315	4	8	12
316-335	1	7	8
336-355	-	1	1
356-375	-	1	1

On the basis of scores they made on the Test of Insight and the Test Anxiety Questionnaire, Ss who qualified to be included in other phases of this study were assigned to "hopeful" and "fearful" groups. A "hopeful" S, in operational terms, was one who scored above the 60th percentile point on the TI scores distribution for the whole group, and who had scored below the 45th percentile point on the distribution of TAQ scores for the whole group. A "fearful" S, on the other hand, was considered one who had scored below the 40th percentile point on the TI scores distribution and who had a score above the 55th percentile point on the TAQ scores distribution. Such a two-criterion classification would, of course, result in eliminating many Ss who do not meet one of the criteria. But it has the advantage of improving the differential prediction of behavior for "hopeful" and "fearful" subjects.

This point is clearly illustrated in a study by Raphelson (1957). He used skin conductance as a criterion against which he could validate classifying his Ss as "anxious" or nonanxious." He found that when Ss were performing on the task, n Ach and Test Anxiety were both related to changes in skin conductance. The relationship, however, was clearest when Ss were classified as anxious-nonanxious on the basis of their scores on both TAQ and n Ach indices. By using this method of classification some of the differences between subgroups which did not reach significance when only one of the two criteria of classification were used reached significance in two of the three experimental periods.

Table 3. Means and Standard Deviations of the TAQ

(High School Form)

Group	N	Mean	SD
Kankakee sample	220	240.89	43.10
Male subjects	103	229.72	43.96
Female subjects	117	251.09	39.83
Watertown sample*	286	245.9	41.1
Male subjects	151	239.17	41.5
Female subjects	135	253.55	39.2

*Normative data from Mandler and Cowen (1958)

Along the same lines are the studies reporting negative correlations between anxiety and n Ach scores. Two such studies are those of Kausler and Trapp (1958) who found a significant negative correlation of -.20 between n Ach scores and anxiety (measured by MAS), and Raphelson (1957) who reports significant negative correlations of -.43 between n Ach and TAQ scores and -.25 between MAS and n Ach scores.

The legitimacy of assuming relatively stronger "fear of failure" tendencies for Ss who have low n Ach scores on TAT records has been questioned and discussed by several authors. The negative correlations between various indices of anxiety and n Ach reflect favorably upon the soundness of this assumption. At least this much can be assumed that in Ss with low n Ach scores the fear of failure is relatively stronger than the need for achievement (or the hope of success). The modification which was introduced in this study for obtaining the Total Scores on the Test of Insight makes an even stronger case for expecting the Ss designated as "hopeful" and those designated as "fearful" to exhibit behavioral differences in terms of reactions to various types of motivational conditions.

To assure distinct grouping of "hopeful" and "fearful" Ss a further step of allowing a kind of "neutral zone" in the middle range of each distribution was taken in the face of losing even a greater number of Ss. As stated before, the middle 10 per cent of Ss on the TAQ distribution were not considered potential candidates for inclusion in the "hopeful" or "fearful" groups, regardless of their scores on the Test of Insight. Since relatively large sex differences were reported in the normative study of the TAQ (High School Form) and confirmed by the data of this study, distributions of scores for boys and girls were treated separately. Thus the TAQ scores corresponding to the 55th percentile point were respectively 239.82, and 254.17 for boys and girls. The scores corresponding to the 45th percentile point were 228.62, and 247.82 in the same order.

The 10 per cent "neutral zone" was broadened to a 20 per cent zone for Test of Insight scores. This decision was made primarily in view of the fact that the TI scores had a relatively limited range (from -14 to +13) and that there was a clustering of cases in the middle ranges of scores. The score corresponding to the 40th percentile point on this test was -1.34 and that corresponding to the 60th percentile was +.78. Therefore, Ss scoring -2 and below, or +1 and above were considered potential candidates for inclusion in our "fearful" and "hopeful"

classification respectively. Since there was no indication in the research that boys generally obtain higher or lower need for achievement indices, the distribution of scores for boys and girls was treated as a single distribution and the same cut-off points were used for both sexes.

Table 4 summarizes our discussion concerning the criteria used for classifying Ss into the "hopeful" and "fearful" motive groups and shows the number of Ss in each group. All together there are 40 "hopeful," and 35 "fearful" Ss who qualified for participation in latter phases of the study. These numbers do not include the four Ss who dropped out of school during the time the study was in progress.

Table 4. Distribution of "Hopeful" and "Fearful"Ss and the Criteria Used for this Classification

(N = 75)

Personality Motive	Sex	TAQ	TI	N
Hopeful	Boys	228 and below	+1 and above	17
	Girls	247 and below	+1 and above	23
Fearful	Boys	240 and above	-2 and below	16
	Girls	255 and above	-2 and below	19

Motivational Conditions

Once the subjects of the study--75 in all--were selected and classified into "hopeful" and "fearful" groups on the basis of scores they made on both TAQ and TI, the Ss in each motive group were separately assigned to one of the three

motivational conditions of the study. The assignment of Ss to conditions was done on a random basis.

The three motivational conditions of the study were: Achievement Condition, Affiliation Condition, and Neutral Condition. One of the considerations in the choice of these conditions was their meaningfulness in day-to-day school activities. It was expected, therefore, that due to strong similarity between motivational conditions employed in this study and those operating in school situations the findings of the study would have important implications for the conduct of school policies and practices.

Table 5 shows the final breakdown of Ss into various subgroups according to their primary personality motive, sex, and the motivational treatment they were assigned to.

Table 5. Distribution of Ss According to Motivational Conditions, Personality Motive, and Sex (N = 75)

Personality Motive	Sex	Motivational Conditions			Total
		Achievement	Affiliation	Neutral	
Hopeful	Boys	7	6	4	17
	Girls	7	8	8	23
Fearful	Boys	6	5	5	16
	Girls	5	7	7	19
Total		25	26	24	75

The motivational conditions were not ends in themselves. They were aroused experimentally so that Ss' performances under different conditions could be measured and compared. Therefore, the section which follows immediately--

describing the motivational conditions--and the two following sections--describing respectively, an index of Ss' perception of the situation they were in and the criterion task which Ss performed--are closely related and were separated only for the purposes of this discussion. We shall first turn to a description of the three motivational conditions used in this investigation.

The Achievement Condition. In this condition an effort was made to introduce external achievement cues into the situation. The purpose was to make Ss highly ego-involved in the task they were going to perform and to study the interfering or facilitating effects of a high degree of ego-involvement on task performance. For the purposes of this study the construct of need for achievement, the experimental arousal of which was the aim of this condition, was defined as need for the attainment of a standard of excellence.

The setting for this condition was a special room in which most of the group testing was done in the school.

Three days before the scheduled testing session, students assigned to this condition by a random procedure each received a card from the principal's office advising them of the date, place, and purpose of testing. Since the information given to Ss on this card was a part of the experimental manipulation of the situation, it will be reproduced here:

Name_____Home Room_____

Report to Room____ at_____on_____
(to)

You are going to take a very important test having to do with your understanding of numbers and mathematics. We urge you to brush up your knowledge of arithmetic problems and do a review of the basic facts and issues in the area between now and Friday.

The scores you make on this test will be kept as a part of your permanent record at school.

On the day of testing, the Experimenter (E) was accompanied and introduced to the class by the Director of Testing at the school. The latter introduced E as

> "A member of the staff at the University of Illinois Bureau of Educational Research who is presently conducting a serious and significant psychological study in connection with the U. of I. High School Mathematics Project."[2]

He also told the students that,

> "Because of the importance of the study, scores you make on today's test will be made part of the permanent record of each of you at the school."

At this point the Experimenter took over and made the following remarks from memory with the help of notes he had in his hands:

> "The test you are going to take today is part of a group of tests which over one hundred state colleges and universities throughout the country use for selection and admission of Freshmen students. Although the test might seem rather simple at the first glance, we have every reason to believe that it measures important qualities of an individual such as his level of intelligence, his ability to evaluate situations quickly and accurately, and his ability to organize groups or material.
>
> "As for the meaning of high and low scores on this test, in terms of the objectives of high school education, it has been found that students who score in the upper third of the group on this test will have no difficulty getting through their mathematics courses in high school; those who score in the middle third pass their math courses if they put a reasonable amount of work in; and those who score in the bottom third will find it difficult to do the required work satisfactorily.
>
> "Another piece of information shows that students in the top quarter of their class on this test finish college; those in the second and third quarters usually graduate from high school but do not go to college; and those in the bottom quarter often find it difficult to complete high school and usually drop out before graduation.

---

[2]It should be pointed out that after the experimentation period was over for each of the motivational conditions, Ss were briefly informed of the true purpose and meaning of the study. They were also told that the information they were given was not based on facts. Teachers and other school officials involved were, of course, aware of this from the start of the experiment.

> "I can also give you information on how other groups with which you can compare yourselves have done on this test in terms of the percentile scores they have made on the test. University of Illinois Juniors and Seniors scored around 90-95 percentiles--that is, they answered 90 to 95 per cent of the items correctly; Evanston Township High School students scored around 75-85 percentiles; and students at a small community high school in southern Illinois were able to get only 20-25 per cent of the items correct.
>
> "Let us now proceed to the test and see how well you can do on it."

All throughout the testing period, the Experimenter made a deliberate effort to be serious, himself deeply involved in what he was doing and saying, and even unapproachable in the sense that he did not display the offhand manner which he could show under the other conditions.

The Affiliation Condition. In this condition an effort was made to introduce external affiliation cues into the situation. The purpose was to study the effects of experimental arousal of the need for affiliation on the performance of Ss in various groups.

As has been clearly demonstrated by French (1956), and Atkinson and Raphelson (1956), n Affiliation is quite different from n Achievement. The two motives elicit different types of responses in different individuals and have different behavioral correlates. In contrast to conditions of achievement which are stressful or anxiety-producing and which lower the performance, conditions of affiliation would seem to bring about less stress for either fearful or hopeful Ss. For the purposes of this study need for affiliation, the arousal of which was the aim of this Condition, was defined as the need to establish and/or maintain warm and supporting interpersonal relationships.

The setting for this condition was the same testing room used in the Achievement Condition. Three days before the scheduled testing session, students assigned to this condition by a random procedure, each received a card from the principal's office advising them of the date, place, and purpose of testing.

Since the information given to Ss on this card was a part of the experimental manipulation of the situation, it is reproduced here:

Name_____Home Room_____

Report to Room_____at_____on_____

You are going to participate in a study of how people choose their friends. We are sure that you will enjoy what you will be doing during that period.

On the day of testing the Experimenter (E) was introduced to the group by the Director of Testing at the school as

"Mr. _____ from the University of Illinois, who has planned a very interesting sort of activity for you this period. He will describe it to you now. Mr. _____!

E then told the group in a very warm and friendly manner,

"The activity you are going to participate in concerns the problem of morale in small groups. In several previous studies it has been found that interpersonal relationships are a significant factor in determining the amount of satisfaction members of a group experience when working together. At present we are concerned with friendship patterns in groups and with the question of how members of a group see and describe each other. What you are going to do now will give us some additional data on this point. Moreover, the information collected today will be used by the school as a basis for forming the school clubs next year.

"Another point to be mentioned is that in case you are not sufficiently acquainted with some of the members of the group, you are to act on the basis of the first impressions you form of those persons for the purpose of things we are going to be doing during the next one hour and a half."

At this point the Experimenter distributed a six-page booklet containing a sociometric procedure which the Ss were supposed to go through as a major part of the experimental manipulation of the situation. It was expected that such an activity would lead to a strong arousal of need for affiliation. All throughout the testing period E tried to maintain a friendly and informal atmosphere in the

room. He also made an effort to talk to Ss on a warm personal basis rather than in a business-like manner which showed lack of interest in students as individuals.

The sociometric procedure used in this study was an adaptation of the one employed by Shipley and Veroff (1952) in their study of a projective measure of need for affiliation. It has been shown to be a valid procedure for arousing n Affiliation. That is, fantasy productions of Ss who had followed through this procedure contained significantly more affiliation imagery than the productions of the same Ss when they had not participated in the sociometric procedure.

The special form of the procedure designed for use in this investigation was called "The Inventory of Interpersonal Relationships," and was composed of three main parts. The first major part consisted of a list of 15 adjectives arranged in alphabetic order, namely, aggressive, anti-social, argumentative, conceited, cooperative, entertaining, friendly, independent, intolerent, modest, self-assured, sincere, submissive, sympathetic, and timid. Ss were first asked to rank these adjectives in terms of their degree of "attractiveness" to them. "First, study the list and choose the one adjective which, when ascribed to a person, would make him most attractive to you. Write 1 beside this adjective in the "Rank" column. Next, write 15 beside the adjective which, when ascribed to a person, would make him least attractive to you. Continue working from the two extremes toward the center until you have numbered all fifteen adjectives. The last adjective you number will receive rank 8."

Next E started somewhere in the room and asked one of the students to stand up. This was student No. 1. The second part of the Inventory was made up of a table with students' numbers in the first left hand column and the same list of 15 adjectives used in part one on top of the page heading columns 2 through 16. As each student took turn to stand up, all the other students, as well as the student standing up, were asked to choose two adjectives, out of the list of

15 provided, which best described the student standing up; and also two adjectives which described him least well.

Ss were also told that, "While rating each student try to remember how you feel about him (or her) on the basis of observations you have made of his behavior in your personal relations with him. The purpose is to obtain an accurate picture of the structure of interpersonal relationships among people with a fair degree of closeness or association."

The third part of the Inventory contained student numbers and a blank space after each number in which the name of the student having a given number could be written. Finally, in this section each S selected three students from the group whom he would choose as close personal friends. The complete form of the Inventory of Interpersonal Relationships prepared for this study is reproduced in Appendix C.

The Neutral Condition. In this condition no effort was made to introduce external achievement or affiliation cues into the situation. To achieve this end, the amount of information given the subjects concerning the task they were going to perform was kept to a minimum. Performance, in other words, was expected to be determined primarily, if not solely, by the strength of Ss' motives as general and stable characteristics of their personality. Of course, contextual cues present in the situation may help increase or decrease the strength of a motive but their effects, in the absence of external arousal, are considered negligible. Thus the neutral condition can be considered a sort of "control" condition for the other two conditions.

The room used for testing was the same room in which the testing for achievement and affiliation conditions was done. Three days before the scheduled testing session, students assigned to this condition by a random procedure, each received a card from the Principal's Office advising them of the

date, place, and purpose of testing. Since the information given to Ss on this card was a part of the experimental manipulation of the situation, it will be reproduced here:

Name_____Home Room_____

Report to Room_____at_____on_____
(to)

You are going to take an experimental form of a test which is being developed and should be tried on several groups of students. This will establish some norms for the test so that scores students make on it in the future can be interpreted.

On the day of testing, E was introduced to the group by the Director of Testing at the school as

"A graduate assistant at the University of Illinois who is trying to establish some norms for a group of tests."

At this point the Experimenter took over and made the following remarks from memory with the help of notes he had in his hands:

"The test you are going to take today is part of a group of tests in developmental stage at the University of Illinois. For this reason there is very little information that I can give you about the test and the meaning of your scores on it. At present we are giving the test to a sample of high school students in order to find out how they do on it. This information will be used in establishing norms for the test. From this point of view, your performance on this test is very important in giving us accurate information about the test."

All throughout the testing period E tried to be as "normal" and "natural" in his behavior as possible, avoiding giving Ss motivational cues of any particular sort.

The Performance Criterion

Immediately after the motivational conditions of the study were introduced in the manner described in previous sections of this chapter, Ss were given a

school-like task to perform. The task was a special kind of arithmetic operations test. The method has been formerly used by Duker (1949) and Wendt (1955) in their studies of the relation between performance and motivation. The adaptation used in this study came very close to the one used by Wendt. A copy of the final version of the instrument which was called the Arithemtic Operations Test (AOT) appears in Appendix D.

Each task unit or item involved two or more of the four fundamental arithmetic operations plus one smaller-vs-larger judgment which was necessary for obtaining the final answer. There were six one-digit numbers in each item arranged in two rows of three digits each with appropriate signs between them to indicate the operation desired. Subjects were instructed to figure out the answer to the first and the second rows separately without writing down any of the computations. They were asked further to subtract the row answer which was smaller from the row answer which was larger. This smaller-vs-larger judgment and the subtraction following it gave Ss the final answer to each item which they put down as their answer. Brackets were provided to the right of each item for Ss to put their answers in.

To make the description of the test more complete the instructions appearing on the first page of the test booklet will be reproduced here. They read:

> "This is a test of arithmetic operations. It aims at measuring the relative speed with which you perform such operations accurately. Each item involves two or more of the four fundamental operations. There are six one-digit numbers in each item. The numbers are placed in two rows of three numbers each with appropriate signs between them to indicate the operations desired. The operations in each line should be done separately. Then the absolute difference between the results of the two rows should be figured out. This gives you a number which is your answer for that particular item. The answer is to be put in the parentheses at the right of the item. All operations should be carried on mentally, and no paper or pencil is to be used except for writing the final answer to the items. Try all items; do not skip any.
>
> "Following is an example of the kind of items making up the test:

$(3 \times 5) + 4$

$6 + 7 - 2$ (8)

"In the first row, 3 times 5 is 15 plus 4 gives us 19; in the second row, we have 6 plus 7, which is 13, minus 2, which gives us 11. The difference between the two results --19 and 11--is 8. This final answer (8 in this case) is put inside the parentheses.

"Here is a second example for you to work out yourself before you start on the test items:

$5 + 8 - 6$

$(4 \div 2) 5$ (____)

"BEGIN NOW AND TURN IN YOUR PAPER AS SOON AS YOU ARE THROUGH."

There were 60 such items in the test evenly spaced on three pages of 20 items each. The items included in the final form of the test were randomly selected from a pool of 150 such items prepared by the author. The preliminary form of the test was tried out on a sample of juniors in Arcola High School, Arcola, Illinois. As a result of this tryout, ambiguities in the Instructions as well as in the desired order of operations in a few of the items were improved. The tryout also gave the author a clearer idea of how many items could reasonably be expected to be completed in the time assigned to the performance task.

The main reason for selecting the ACT as the performance task in this investigation was that it required some degree of attentiveness or concentration on the part of Ss. Such a task would be expected to be rather "sensitive" to variations among Ss with regard to situational and personality anxiety, both important variables of this study. This, in turn, would make testing some of the hypotheses of the study a much simpler task.

There were, of course, other features of the task which counted in its favor. The complexity of the task was at a level which assured satisfactory distribution or spread of scores over a wide range. This expectation was

supported by the data obtained from the tryout as well as its final administration to Ss under different motivational conditions.

Also in favor of selecting the AOT as the performance task was the flexibility it promised in terms of the length of time necessary for its administration. For, it seemed desirable to keep the length of time necessary for imposing the motivational conditions, administering the performance task, and completing the Ego-Involvement Questionnaire, a description of which will follow in the next section of this chapter, all within the limits of a 55-minute class period. This aim was achieved except for the Affiliation Condition in which case a regular and a Home Room period, adding up to 75 minutes, had to be used due to the longer time required for the sociometric procedure which was a part of the process by which feelings of affiliation were aroused in Ss.

In introducing the performance task, an effort was made to assure that the transition from imposing the motivational conditions to introducing the performance task would seem as natural and logical to Ss as possible. This was a simpler job for the Achievement Condition and the Neutral Condition. In the Affiliation Condition, however, primarily due to a greater difference in the nature of the two tasks, an extra step was necessary to be taken. In this condition, when the sociometric procedure described in the Inventory of Interpersonal Relationships was completed the Experimenter collected the Inventory booklets and then said:

> "Now we come to the second part of our program for today. Here we are curious to know how much your choice of friends or your rating them on some personality traits agrees with how well they do on a simple paper and pencil test. The question we are asking, in other words, is whether one's choice of friends is, consciously or unconsciously, influenced by things other than personality traits as such."

At this point, E distributed the Arithmetic Operations Test. When distributing the AOT booklets, in each condition, the Experimenter said:

"Wait till everyone has a copy; then you follow along silently as I read the instructions aloud."

After finishing reading the instructions, E paused and listened for "three" which was the correct answer to the second example. Upon hearing "three" he said:

"Correct. Are there any questions about how we got this answer? All right. If you are all clear about what you are supposed to do let us begin now. You have 20 minutes to finish the test. All papers will be collected at the end of the 20-minute period. Remember that you must work out the problems in your head, and use your pencil only to put down the final answer to each item."

During the testing period E watched for Ss who might have preferred to skip several items in succession in order to find some "easy ones." Also watched were Ss who showed curiosity in knowing what answers the student next to them had put down. Test booklets were collected 20 minutes after Ss were told to start working on the problems.

Table 6 shows the distribution of scores for the AOT for all the subjects.

Table 6. Distribution of Arithmetic Operations Test Scores

(N = 75)

Score	Frequency
6-10	3
11-15	1
16-20	5
21-25	6
26-30	4
31-35	7
36-40	13
41-45	7
46-50	10
51-55	13
56-60	6

The Ego-Involvement Questionnaire

Quite frequently in research studies where the major procedure for manipulating the situation consists of verbal instructions or the stated purposes for which test scores are to be used, one discovers that the investigators have only hoped that the instructions given or the information communicated to Ss are taken seriously or exactly as they were meant to. But usually no evidence is collected and/or presented that this expectation has actually been realized. In Sarason's (1954) words,

> "An individual's behavior is in part a function of the nature of the instructions. More important, however, is the conclusion that instructions have a differential effect. Failure either to be aware or to take account of these differential effects may have several consequences. First, the significance of observed individual differences may be misinterpreted and unwarranted generalizations made. Second, prediction from one situation to another becomes increasingly hazardous and inaccurate. Third, the clinician or the researcher may overlook important ways of varying or influencing important aspects of the individual's behavior. Fourth, when, as in the test anxiety, differential effects amount to apparently opposite effects in different individuals, a "cancelling out" effect may take place so that insignificant findings obscure significant ones."

Or as Shaffer or Lazarus (1952) state the problem,

> "Getting the subject to perform in such a way as to provide the observer with a good sample of his characteristic reactions to most test situations is an extremely complicated task. It is often a matter of getting the subject to take the experimenter's instructions seriously or in a uniform way. This is particularly true in experiments where subjects must be subjected to psychological stress by telling them they are failing in some task. It is possible that some subjects do not become emotionally involved, in which case the experimenter has not succeeded in stressing his subjects...."

In order to provide an answer to questions such as these, an Ego-Involvement Questionnaire (EIQ) was prepared to measure the feelings of the Ss toward each motivational condition and to provide an index of their emotional involvement in the treatment condition. The main purpose in the development and use of this

instrument was to show that different motivational conditions actually caused the Ss to be differentially involved in the task. In other words, it was used to show that the experimental manipulations were "successful." Furthermore, the EI scores were used to test one of the hypotheses of the study concerning the difference in responsiveness of boys and girls, and of "hopeful" and "fearful" Ss, to different kinds of motivational conditions.

The preliminary form of the Questionnaire consisted of 22 items all concerned with the feelings and attitudes of Ss concerning the Arithmetic Operations Test from the time they were informed to have been selected for taking the test up to the time they actually took the test. This form of the instrument was given a tryout in two classes at the University High School, Urbana, Illinois. Students filled out the questionnaire immediately after they took a final examination in their mathematics course.

On the basis of the preliminary data obtained from this administration of the Questionnaire, and of various types of item analyses done with the data, three of the items were eliminated from the test and the necessary modifications were made in some of the other items as well as in the Instructions to the Ss. The final version of the instrument is considered to have logical or face validity on the basis of the items which have gone into making it. A complete copy of the Questionnaire is included in Appendix E, with the Answer Sheet prepared for the EIQ appearing in Appendix F.

Immediately after the Ss finished taking the AOT, they were given this questionnaire to fill out. At this time the Experimenter made the following remarks:

> "We now come to the last part of our schedule for today. Here are some questions concerning your feelings about today's test. As you have probably experienced yourself, the same external or objective situation may arouse quite different feelings in different people. What we like to know is what today's test meant to <u>you</u> as an individual. Since feelings

> and perceptions are, for the most part, subjective matters, none of the alternative answers to a given question can be claimed to be "better" or "worse" than any other of the alternatives. In other words, there are no "right" or "wrong" answers to the questions asked here. What is very important, therefore, is a sincere effort on your part to carefully think of and state your feelings about the test. Your co-operation in this matter contributes a great deal to the meaningfulness of the questionnaire."

Then the questionnaire booklets and the answer sheets were distributed. Ss gave their responses to the items of the questionnaire on a five-point scale. They marked their answers on a separate answer sheet. To make clear the operation called for in answering the questionnaire, the Instructions appearing on the top page of the EIQ will be reproduced here:

> "The numbers in the first column of the answer sheet refer to the items of the questionnaire. In the row following each item number you see numbers 1, 2, 3, 4, and 5. These numbers are chosen to represent the strength or intensity of the feeling under consideration in each of the questionnaire items: 1 represents the higher extreme or the full strength of the feeling mentioned in the item; 5 represents the lower extreme or absence of such a feeling; 2, 3, and 4 respectively represent degrees between the two extremes from high to low. The following list of terms, which also head the columns of the answer sheet, will help you decide which number best represents the strength of your feeling in each case:
>
> 1. Extremely, entirely, exceptionally, everything
> 2. Markedly, substantially, immensely, a great deal, much
> 3. Moderately, noticeably, perceptibly, about average
> 4. Slightly, somewhat, little
> 5. Not at all, nothing
>
> "After reading each item, look at the proper row of the answer sheet and choose the one alternative which most nearly describes the strength of your feeling regarding that issue. Indicate your choice by crossing out (X) the number you choose as your answer.
>
> "ANSWER ALL QUESTIONS AND DO NOT LEAVE ANY BLANKS.
>
> "REMEMBER, ALL STATEMENTS HAVE TO DO WITH TODAY'S TEST."

To obtain the score values of the ratings marked by Ss, the formula

$$\frac{100\ (R - .5)}{N}$$

proposed by Hull (1928) was used where R is the rank in each case and N is the total number of ranks used--5 in this case. This gave a percentile equivalent for each rank which was then looked up in the table prepared by Hull for transmuting rankings into units of amount. Original ranks and the corresponding score values obtained by this procedure are given in Table 7.

Table 7. Original Ranks and the Corresponding Score Values Used in the EIQ

Rank	Score Value
1	7.5
2	6.0
3	5.0
4	4.0
5	2.5

Table 8 shows the distribution of the Ego-Involvement scores for the subjects of this study.

Table 8. Distribution of the Ego-Involvement Scores (N = 75)

Score	Frequency
66-70	3
71-75	3
76-80	3
81-85	12
86-90	16
91-95	16
96-100	8
101-105	9
106-110	2
111-115	3

Statistical Control of Ss Level of Ability

It would not be difficult to establish that high school students exhibit differences with regard to their competence in performing arithmetic operations tasks of various kinds. In order to make any interpretation of the expected differences in performance of groups of high school students under different motivational conditions, one has to be able to rule out the possibility of these differences being due to differences in the initial level of ability of such groups.

In the present study, numerical ability was clearly the most important variable with regard to which one would want to assure oneself of equal initial ability for all groups. If this condition was met and if other important variables which were likely to influence performance were random for different groups of Ss, one could safely attribute any observed differences in performance to differences between motivational conditions under which Ss were performing.

To achieve this purpose, the Numerical Ability Test (Form A) of the Differential Aptitude Tests battery was administered to all 238 Ss taking the first two tests in the study, i.e., the Test of Insight, and the Test Anxiety Questionnaire. But only the data concerning the 75 Ss who stayed in the study to the end were utilized to equate statistically the Ss on initial level of numerical ability. The test was administered in the Home Room periods previously used for TI and the TAQ testing of the Ss, and under the same "normal," "neutral" conditions. No connection was established between this testing and other previous tests.

Table 9 shows the distribution of scores on DAT Numerical Ability (Form A) for the subjects of this study ($N = 75$).

Table 9. Distribution of the DAT Numerical Ability (Form A) Scores (N = 75)

Score	Frequency
-1-5	5
6-10	1
11-15	12
16-20	7
21-25	16
26-30	16
31-35	11
36-40	7

CHAPTER THREE: RESULTS AND DISCUSSION

Two major kinds of analyses were done of the data of this study. First was an inferential type of analysis, primarily in terms of variance and covariance analyses, the main purpose of which was testing various hypotheses of the study in accordance with established statistical procedures and principles. The second type of analysis was descriptive in nature and was undertaken in order to throw light on those outcomes of the study which either did not reach the commonly accepted levels of significance or were by-products of the process of investigation. The latter type of analysis, though less conclusive than the former, is usually more illuminative. It provides clues to new solutions, or problems for that matter, which are usually covered from the eyes of a more to-the-point analysis. This seems to be specially true of psychological-educational investigations, such as this, where the variables under investigation are, more or less, unrefined and where the measuring instruments utilized are not the most precise tools of measurement.

Inferential Analyses

It seems highly appropriate to start this discussion by summarizing our description of the variables of this investigation. There were three independent variables in the study: Personality motive ("Hopeful," and "Fearful"), motivational conditions (Achievement, Affiliation, and Neutral), and sex (Male and Female). This gave us a 2 x 3 x 2 experimental design for variance and covariance analyses. It also provided us with 12 groups to be compared and contrasted in testing various hypotheses of the experiment. The comparison among groups was done in terms of two dependent variables: responses to an ego-involvement questionnaire and performance on an arithmetic-operations test. For the latter comparison another variable, i.e., scores on DAT Numerical Ability Test (Form A), was used as statistical control of the initial level of ability among Ss.

The first analysis undertaken was that of the ego-involvement scores. Table 10 shows the means and standard deviations for the 12 groups in the study. It should be pointed out that because of small Ns in some of the groups, extreme scores might have unduly influenced the means reported. This danger, however, does not seem to be very severe in view of the fact that only one of the groups

Table 10. Group Means and Standard Deviations on the EIQ

Personality Motive	Sex	Motivational Conditions						Total	
		Achievement		Affiliation		Neutral			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hopeful	Boys	97.28	8.41	88.67	10.82	89.50	11.23	92.41	10.23
	Girls	88.71	10.44	91.75	7.75	85.62	9.13	88.69	9.06
Fearful	Boys	95.00	11.52	84.30	9.49	92.40	13.75	90.84	11.86
	Girls	101.30	12.70	89.86	8.72	90.36	6.22	93.05	10.26
Total		95.14	11.18	89.10	8.94	89.06	9.58	91.10	10.21

has an N of less than five. Inspection of Table 10 also assures us of the homogeneity of variance for the groups included in the study so that this requirement of the variance analysis is satisfied and the differences obtained, if any, can be appropriately interpreted in terms of means rather than the variances of the groups.

Table 11 contains the summary of the variance analysis for the EIQ scores. It shows the different sources of variation in score, degrees of freedom associated with each source of variation, sums of squares and mean squares attributed to each source of variation, and finally the significance indices or

Table 11. Analysis of Variance for Ego-Involvement Scores

Source of Variation	Sum of Squares	df	Mean Square	F	F_{95}	F_{99}
1. Main Effects:						
Conditions	612.07	2	306.03	3.08*	3.14	4.96
Personality Motive	58.33	1	58.33			
Sex	17.93	1	17.93			
2. First Order Interactions:						
Conditions x Motives	251.74	2	125.87	1.27	3.14	4.96
Conditions x Sex	185.87	2	92.93			
Personality Motive x Sex	159.44	1	159.44	1.60	3.99	7.05
3. Second Order Interaction:						
Conditions x Motive x Sex	177.02	2	88.51			
4. Within Groups Interaction						
(Error)	6259.60	63	99.36			
Total	7722	74				

*P between .05 and .10

the F-ratios obtained from this analysis as well as those reported in the F-tables to be significant at the .05 and .01 levels when the number of degrees of freedom are the same as those in the present analysis.

As can be seen from Table 11 the F-ratio for conditions is significant between the .05 and the .10 levels. This means that there are significant differences between groups of Ss undergoing different motivational conditions in terms of their degree of emotional involvement in those conditions. Inspection of Table 10 shows that this difference actually comes from that existing between Achievement Condition on the one hand, and Affiliation and Neutral Conditions on the other. The differences in mean ego-involvement scores among the groups under the latter two conditions are so small, and also inconsistent in favor of one or the other condition, that they can be ignored all together. The lack of significant differences between the Affiliation Condition and the Neutral Condition is sufficiently clear so that one does not need to check it by means of a t-test of significance.

Assuming that the Ego-Involvement Questionnaire has logical or face validity, as we have done in this study, these data seem to provide support for the first hypothesis of the study. When the motivation to achieve is indexed by Ss' responses to a self-rating instrument indicating how strongly they are concerned with achieving a standard of excellence in the task they have just performed, such a motive can be aroused in Ss through verbal instructions and the stated purposes for which the results obtained from their performance on the task are to be used. Subjects undergoing the affiliation and neutral conditions are significantly less achievement-motivated, in the same sense, than those in whom the motive to achieve has been aroused experimentally.

None of the other main effects involved in this analysis were significant. In other words, members of the two motive groups, i.e., the "hopeful," and the

"fearful," were not significantly different in their emotional involvement in the performance task as a result of the verbal instructions given to them prior to their performing the task. Also, there was no sex difference.

Of the four interaction sums of squares obtained as a result of this analysis none proved to be significantly different from zero. Three of these were the first-order interactions among the three main variables of the analysis, namely, motivational conditions, personality motive, and sex, taken two at a time. The other non-significant interaction was the triple interaction among all of these three main variables. It should be noted that according to standard statistical practices in cases where the triple interaction turns out to be insignificant, the sum of squares attributed to that source of variation is ordinarily pooled, along with its degrees of freedom, with the within groups sum of squares and used as the error term in computing various F-ratios. The improvement in the F-ratios calculated for the present analysis, however, was so slight--only one one-hundredth of a point for the largest F obtained for Conditions--that the unpooled sums of squares and degrees of freedom are reported in Table 11 in favor of the more detailed information thus provided of the breakdown of the total sum of squares.

According to Hypothesis II of the study, boys were expected to show a greater degree of ego-involvement in the achievement-oriented conditions than girls whereas girls were expected to show a greater degree of ego-involvement in the affiliation-oriented conditions than boys. Clearly, this is a statement of an interaction between sex and two of the motivational conditions. A significant interaction term between sex and motivational conditions would have given us some assurance of the possibility of this hypothesis being supported by the data of this study. In the absence of such a significant interaction term, however, the two t-ratios needed for testing the hypothesis under consideration were computed. Although neither of the t-values obtained were statistically

significant at the commonly accepted levels of significance, the differences in mean ego-involvement scores of boys and girls were in the predicted direction. As can be seen in Table 8, under conditions of achievement, boys had a mean score of 96.23 (with an SD of 9.60) while the girls' mean score for the same condition was 93.96 (with an SD of 13.00). The variances of the two groups are not significantly different and can be assumed to be derived from the same general population. Under conditions of affiliation, boys' mean ego-involvement score was only 86.68 (with an SD of 9.99) whereas the girls had a mean score of 90.87 (with an SD of 7.97). The group variances are again homogeneous for this condition.

These results though not supporting Hypothesis II of the study at a satisfactory level of significance may be taken as implying that a test of this hypothesis is worth considering with other types of experimental manipulations, designs, and perhaps, instruments.

The second dependent variable of the study was the arithmetic operations task. An analysis of covariance was performed on this variable with initial level of numerical ability controlled statistically. Table 12 shows the means and standard deviations of various groups on the AOT when "raw" scores are used. Since there was some tendency for groups with large means to have small variances a square transformation was applied to the AOT scores so as to reduce this relationship.

The square transformation also helped make the regression of the AOT on the DAT scores more nearly linear than when "raw" AOT scores were used in plotting the regression line of the former on the latter variable. The product-moment correlation between the DAT and the untransformed AOT scores was found to be +.631. The same coefficient increased to +.646 when transformed rather than raw AOT scores were used. This relatively high correlation between the control

and the dependent variable of the study was considered a factor in favor of choosing the analysis of covariance as the statistical technique to be used with the data of this study.

Table 12. Group Means and Standard Deviations on the AOT When Raw Scores Were Used

Personality Motive	Sex	Motivational Conditions						Total	
		Achievement		Affiliation		Neutral			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hopeful	Boys	43.43	11.46	46.17	12.50	32.25	31.01	41.76	14.66
	Girls	36.28	16.55	40.00	11.44	45.25	7.40	40.69	12.15
Fearful	Boys	30.67	18.36	44.60	8.99	25.80	16.02	33.50	16.12
	Girls	30.40	12.01	43.43	10.33	42.00	10.02	39.47	11.51
Total		35.76	14.87	43.23	10.59	38.08	14.43	39.09	13.58

Table 13 shows the means and the standard deviations for all 12 groups in this analysis of the DAT Numerical Ability (Form A) scores. The means and the standard deviations of the transformed AOT scores are given in Table 14.

Table 13. Group Means and Standard Deviations on the DAT Numerical Ability (Form A)

Personality Motive	Sex	Motivational Conditions							
		Achievement		Affiliation		Neutral			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hopeful	Boys	28.43	7.61	22.50	11.26	20.50	13.92	24.47	10.48
	Girls	28.43	7.87	22.25	11.50	27.75	6.98	26.04	9.09
Fearful	Boys	16.33	8.38	26.00	6.52	21.00	11.58	20.81	9.07
	Girls	13.40	12.60	22.00	8.21	27.57	5.35	21.79	10.04
Total		22.52	10.91	22.96	9.36	25.08	9.32	23.49	9.82

Since a significant difference, reported earlier in this section, was found among the Ego-Involvement scores of the Ss in the three Motivational Conditions of the study, the regression of the AOT on the EIQ scores was checked. It was decided that, in case this regression proved to be significant, the AOT scores would be "adjusted" for differences in ego-involvement. Ego-involvement was considered an intervening variable in this case. The correlation between the two sets of scores, however, was so small that using the obtained AOT scores or

Table 14. Group Means and Standard Deviations on the AOT When Transformed Scores Were Used

Personality Motive	Sex	Motivational Conditions: Achievement Mean	Achievement SD	Affiliation Mean	Affiliation SD	Neutral Mean	Neutral SD	Total Mean	Total SD
Hopeful	Boys	1998.57	913.86	2261.50	1003.49	1382.75	1386.82	1946.47	1051.82
	Girls	1551.43	1270.08	1714.50	775.06	2095.50	692.05	1797.32	915.20
Fearful	Boys	1204.67	1165.16	2053.80	781.56	871.00	1148.44	1365.75	1103.13
	Girls	1039.60	541.40	1977.43	878.18	1850.00	906.12	1683.68	869.16
Total		1491.04	1040.65	1976.77	833.71	1650.00	1032.35	1710.29	979.62

the AOT scores adjusted for differences in ego-involvement seemed to be the same for all practical purposes. The product-moment coefficient of correlation between EIQ and the AOT was found to be -.016. This coefficient is clearly insignificant when we consider the size of the group on which it is based. A scatterplot diagramming the regression of the AOT on the EIQ scores did not show any trend of curvalinearity of regression. The presence of such a trend might have suggested an increase in the size of the coefficient of correlation if, for example, eta was used in place of the Pearson r. The absence of a curvilinear

trend, however, was so clear in the scatterplot that there was no need for applying one of the standard tests of curvilinearity such as the Blakeman test.

Table 15 shows the summary of the last step of the analysis of covariance used with the data under consideration. The model employed in the present analysis was the one outlined by Edwards (1950). Table 15 contains the two main

Table 15. Summary of the Analysis of Covariance for the AOT Scores When DAT Numerical Ability Was Used as Control Variable

Source of Variation	SS of Errors of Estimate	df	Mean Square	F	F_{95}	F_{99}
Total	41292241.58	73				
Within groups	33661644.33	62	542929.75			
Between groups (adjusted means)	7630597.25	11	693690.66	1.28	1.95	2.55

sources of variation in the scores made by different groups. The sum of squares of errors of estimate attributed to the first source, namely, the within groups variation, when divided by its degrees of freedom, 63 in this case, gives an estimate of the error variance. The sum of squares of errors of estimate attributed to the second major source, namely, the variation between groups, is obtained by subtracting the within groups sum of squares of errors of estimate from the total sum of squares of errors of estimate. This gives the sum of squares of errors of estimate for the "adjusted" means, i.e., adjusted to a common mean on the DAT Numerical Ability for all groups. When divided by its degrees of freedom, 11 in this case, this sum of squares of errors of estimate gives an estimate of the non-error variance between groups.

The overall F for the analysis of covariance, as can be seen from Table 15, was 1.28 while the F value required for significance at the .05 level is 1.95.

An explanation for this lack of significance of the overall F is found when we look at the coefficient of correlation within groups and also the correlation coefficient between the means of the groups on the DAT and AOT. The correlation coefficient within groups is +.650. This relatively high correlation coefficient indicates that there has been a tendency for subjects who scored high on the DAT Numerical Ability to also have high scores on the AOT when tested under the motivational conditions of the study. The trouble, however, is with the almost equally high, i.e., r = +.638, correlation coefficient between the means. This correlation coefficient indicates an equally strong tendency for the groups with the higher initial means on the DAT Numerical to have higher means on the AOT when tested under the motivational conditions of the study.

However, since an insignificant overall F did not necessarily mean that the significance indices which could be computed for various components of the between groups sum of squares would also be insignificant, it was decided to further break down the between adjusted means sum of squares of errors of estimate into various components forming it. Since doing this by straight covariance analysis technique, such as the one used in computing the overall F, was a rather laborious task, it was decided that a regression equation formula be written for the regression of the AOT on the DAT score by means of which all individual AOT scores could be "adjusted" to a common DAT mean for the whole group of 75 subjects. The following formula was written to be used in this connection:

$$\tilde{Y} = r_{AOT \cdot DAT} \left(\frac{\sigma_{AOT}}{\sigma_{DAT}} \right) \left(X_{DAT} - \bar{X}_{DAT} \right) + \bar{Y}_{AOT}$$

where $\tilde{Y}$ was the predicted AOT score. The adjusted AOT score was obtained by subtracting each predicted AOT score from the corresponding obtained AOT score. Thus:

$$Y' = Y - \tilde{Y}.$$

Once all the individual AOT scores were adjusted to a common initial level of ability on the DAT, the analysis of variance technique was applied to the data in the manner previously described for the Ego-Involvement variable. Table 16 shows the means and the standard deviations of the adjusted, transformed AOT scores for the 12 groups in the study. Table 17 contains the summary of the analysis of variance done with the data of Table 16.

Table 16. Group Means and Standard Deviations on the AOT When Adjusted Transformed Scores Were Used

Personality Motive	Sex	Motivational Conditions						Total	
		Achievement		Affiliation		Neutral			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Hopeful	Boys	-30.14	455.29	+607.33	827.08	-135.00	603.00	+170.18	694.81
	Girls	-476.86	1008.94	+84.12	441.82	+111.00	798.75	-77.26	784.80
Fearful	Boys	-44.50	952.42	+182.00	680.88	-678.80	788.74	-171.94	851.93
	Girls	-20.60	824.71	+362.86	727.52	-123.28	666.75	+82.84	725.08
Total		-156.76	810.73	+298.73	658.90	-162.87	741.85	-.81	761.02

As a check on the homogeneity of the variances of the groups appearing in the analysis, the F-test technique recommended by Edwards (1954) as a short-cut method to the somewhat more difficult and laborious Bartlett test of the homogeneity of variances was used. This test involves the largest and the smallest variances obtained for different groups in the study. According to this method if the F-ratio obtained from the largest and the smallest variances is statistically significant, one would have to use the Bartlett method for the whole group of variances in order to find out how many of the variances and exactly which ones of them are homogeneous and which ones are not. Obtaining an insignificant

Table 17. Summary of the Analysis of Variance for the AOT Scores when Adjusted, Transformed Scores Were Used

Source of Variation	Sum of Squares	df	Mean Square	F	F_{95}	F_{99}
1. Main Effects:						
Conditions	3571213.08	2	1785606.54	3.19	3.14	4.96
Personality Motive	70667.62	1	77667.62			
Sex	1542.59	1	1542.59			
2. First Order Interactions:						
Conditions x Motive	1113502.17	2	556751.08			
Conditions x Sex	1724694.54	2	862347.27	1.54	3.14	4.96
Personality Motive x Sex	1160746.80	1	1160746.80	2.07	3.99	7.05
3. Second Order Interaction:						
Conditions x Motive x Sex	-91577.13*	2	(-45788.56)*			
4. Within Group Interaction: (Error)	35306567.72	63	560421.71			
Total	42857357.39	74				

*See text for explanation

F-ratio, however, would mean that the requirement of the homogeneity of variance is met and all the variances can be said to have been derived from the same population. The data under consideration proved to fit the description of the latter instance. The value of F obtained from dividing the largest variance by the smallest was only 3.34 while the tabulated values of F significant at the 5 and 1 per cent points, and having the same degrees of freedom as the variances used in this computation, were respectively 6.09 and 14.98. The homogeneity of the variances was thus established for the data under investigation.

As can be seen in Table 17 the F-ratio obtained for Motivational Conditions main effect is significant. In other words, subjects under different motivational treatments showed significant differences in performance on the Arithmetic Operations Test even when differences in the initial level of ability was accounted for by adjusting the AOT scores of the pupils to a common grand mean on the DAT Numerical Ability.

The F-ratios for the personality motive and sex main effects in Table 17 are not statistically significant. This means that the performances of hopeful and fearful pupils as distinct motive groups are not significantly different. The same is true of the members of the two sexes. It must be noted, however, that these and other non-significant findings reported for this analysis are those in which all the members of a sex, or a motive group,etc. are included as one single unit. The results may be different when only a certain segment of one of these groups, such as the boys who were fearful and were exposed to the conditions of affiliation, is used. This will become clearer shortly--when we engage in testing some of the hypotheses of the study concerned with only certain segments of the population of the subjects we have used.

None of the interaction terms in Table 17 between the three major variables of the study, i.e., motivational conditions, personality motive, and sex, are significant. In other words, various combinations of these three variables taken two at a time, or all three of them at the same time, do not produce a unique effect.

With regard to the triple interaction between the three variables just named there is a point which deserves mention here. The sum of squares for this interaction, as shown in Table 17, is a negative term. As unlikely as it might seem at the first glance for a sum of squares term to be negative, this is nonetheless possible. An interaction term can be negative if the variables

involved are non-orthogonal, i.e., if they are correlated. This point has been discussed by Garner and McGill (1956) in their article on the relation between information and variance analyses. They suggest that a negative interaction term can be thought of as "due to a negative covariance term that may attenuate or exceed the positive interaction effect."

In formula form, according to Garner and McGill, the components of the interaction variance for the general case can be analyzed as follows:

$$V\,(y:\overline{WX}) = \frac{1}{n}\sum_{i,j} n_{ij.}\,(\bar{y}_{ij.} - \bar{y}_{i..} - \bar{y}_{.j.} + \bar{y})^2$$

$$- \frac{2}{n}\sum_{i,j,} \left(n_{ij.} - \frac{n_{i..}\,n_{.j.}}{n}\right)(\bar{y}_{i..} - \bar{y})\,(\bar{y}_{.j.} - \bar{y})$$

The second term on the right is the negative covariance term which causes the interaction variance to become negative. Garner and McGill suggest that such a negative covariance term makes the concept of interaction "almost meaningless."

Inspection of the cell entries in Table 5 for the distribution of the Ss in various groups formed by the independent variables of the study suggested that non-orthogonality might have existed between the personality motive and sex variables. The presence of a non-orthogonal relationship between the two variables may be explained in terms of the unequal number of the boys and girls who were either "hopeful" or "fearful" in the original group of 220 High School Juniors from which the Ss of this study were chosen. This, however, is not a satisfactory explanation for the following reason: these 220 were the Ss for whom complete Test of Insight and the Test Anxiety Questionnaire records were available. Eighteen subjects, out of a total of 238 tested with both instruments, had to be discarded because of having incomplete records on one or the other of the instruments. Since their records were incomplete, it is not possible to say

what proportion of these pupils were "hopeful," "fearful" or neither according to the criteria of this study.

Moreover, four of the 79 Ss originally selected as "hopeful" or "fearful," dropped out of school while the study was in progress. This also helped throw off the balance of the number of Ss in each group according to personality motive and sex. In view of these facts it seems reasonable to presume that, rather than there existing any genuine relationship between personality motive and sex, the non-orthogonality discovered between the two variables can be attributed to the loss of cases and the consequent imbalance in the number of cases in the cells involved (Table 5). The argument presented here becomes still more convincing if indices of non-orthogonality show only a slight and insignificant relationship between the variables under consideration.

In order to find the actual degree of non-orthogonality present between the two variables, two indices of such a relationship were obtained. The phi coefficient of correlation between sex and personality motive was only +.032 and the chi-square value for the independence of the two variables was only +.0021--both clearly far from being significant. This non-orthogonality could be corrected either by throwing out sufficient number of cases from each cell so as to reduce them to the smallest cell entry in Table 5, or by applying the rather complicated and laborious statistical correction suggested by Garner and McGill in an as yet unpublished paper. Since the relationship was found to be so slight, however, it was decided to keep the negative interaction term but not to interpret it in the manner an interaction is ordinarily interpreted. While adjusting for non-orthogonality might have increased some of the significance ratios we have obtained in this analysis, the small size of the negative interaction suggests this to be highly improbable.

We now turn to a discussion of the test of various hypotheses advanced in Chapter One with regard to the performance of Ss on the arithmetic operations task. Hypotheses I and II were discussed in the previous sections of this paper. This section, therefore, will be devoted to a consideration of the remaining hypotheses, i.e., Hypotheses III, IV, V, and VI. The scores used in testing these hypotheses are the adjusted, transformed AOT scores.

Hypothesis III states that the performance of the subjects who are working under conditions of strong achievement motivation will be inferior to that of Ss who, other things being equal, are performing under conditions of strong affiliation motivation. To test this hypothesis mean group performance of the Ss in Achievement Condition (N = 25) and that of the Ss in Affiliation Condition (N = 26) were subjected to a t-test of significance for differences between means (Table 16). Since the homogeneity of variances for all the 12 groups in the experiment was established, as discussed earlier in this chapter, the variances of the two groups were pooled and a common estimate of the two variances was used. This will be true of all the other tests of hypotheses to be discussed later in this section. The difference of 455.49 obtained between the means of the two conditions gives us a t = 2.79, when divided by the standard error of differences between the two means. The tabulated t-values for significance at the .05 and .01 levels, when a one-tail test is used, are 1.004, and 1.340 respectively. Our t-value of 2.79 is, therefore, significant beyond the .01 level and the third hypothesis of the study is supported by this finding.

Hypothesis IV of the study which is actually a counterpart of Hypothesis III states that performance of subjects in a condition of strong affiliation motivation, where desire for improved interpersonal relations is at its peak, will be superior to performance of Ss in a condition of no induced motivation. To test the superiority of the Affiliation Condition over the Neutral Condition, where

no external motivation was introduced into the situation by minimizing the information Ss received concerning the purpose of the task they were performing and the meaning of the scores they would make, the group means for the two conditions (Table 16) were compared by means of a t-test. The difference between the two means was 461.60, and the standard error of the difference between the means was 150.18. The t of 3.07 thus obtained compared to a value of only 1.339 for significance of a one-tail test at the .01 level with the same number of degrees of freedom as the value being obtained, shows that the difference is very highly significant. Our test, therefore, lends full support to Hypothesis IV of the study.

Hypothesis V of the study states a differential prediction between the performance of the "hopeful" and the "fearful" subjects. It states that under neutral conditions, where no motivation is induced externally, "hopeful" pupils will do better than "fearful" pupils. To test this hypothesis, t-test of significance of differences between two means was employed. The obtained difference in means (Table 16) was 383.75 and the standard error of the difference between the two means was 298.66. The resulting t has a value of 1.285. The probability of a t of this size (with 22 degrees of freedom) happening by chance is greater than .10 and smaller than .15. The finding does not support Hypothesis V of the study.

Hypothesis VI of the study predicts that under conditions of achievement, where great emphasis is put on attaining a standard of excellence, "hopeful" subjects will do less well than "fearful" subjects. Hypothesis VI was tested by significance t-test. The difference between the means of the "hopeful" and the "fearful" Ss performing under Achievement Condition (Ns = 14, and 11, respectively) was 219.87 (Table 16) in favor of the "hopeful" group. The standard error of the difference between the two means was 330.51. The t

tabulated for significance at the .05 level when one is testing a one-tail hypothesis is 1.714. The t obtained is associated with a probability between .25 and .30. Clearly, the data do not support Hypothesis VI of the study.

Descriptive Analysis

In order to further clarify the findings of this study, a descriptive type of analysis was done with a major portion of the data, i.e., the part related to the performance of subjects on the Arithmetic Operations Test.

The first major problem attacked in this analysis was to put the DAT and the AOT scores obtained by all 75 Ss on a common scale so that it would be possible to talk of the DAT scores in terms of the AOT scores or vice versa. This corresponds to statistically controlling the Ss with regard to the initial level of numerical ability--a technique employed in the inferential type analysis of the first section of this chapter.

As a first step in this procedure the AOT scores of all the 75 Ss were rank-ordered. The ranks were then plotted against the AOT scores and a smooth curve was passed through the plotted points. Exactly the same procedure was followed with the DAT Numerical Ability scores. With these two diagrams available, it became quite a simple matter to go from one scale to another. The major use made of these diagrams was to obtain the "equivalent" AOT scores of the various DAT scores. An actual example will make the procedure clear. Suppose we went to know the equivalent AOT score of a DAT score of 27. We enter the diagram for DAT score with this score of 27, and we find that a score of this size corresponds to a rank of 31 on the smoothed curve of the scatterplot of the DAT scores vs ranks. Then we enter the diagram for the AOT scores vs ranks with this rank of 31, obtained from our first diagram, and read the corresponding

AOT score, which is 1970 in this case. Thus a DAT score of 27 is equivalent to a score of 1970 on the AOT.

One of the uses made of these "equivalent" scores can be seen in Table 18. For each of the twelve experimental groups we have two entries in the cells of this table. One is the group mean score on the DAT expressed in terms of an

Table 18. Mean Score Comparisons on the DAT and the AOT when the DAT Scores are Expressed in Terms of Equivalent AOT Scores

Personality Motive	Sex	Motivational Conditions					
		Achievement		Affiliation		Neutral	
		DAT	AOT Change	DAT	AOT Change	DAT	AOT Change
Hopeful	Boys	2220	1998.57 ↘	1370	2261.3 ↗	1200	1382.75 ↗
	Girls	2220	1551.43 ↘	1370	1714.5 ↗	2000	2095.50 ↗
Fearful	Boys	890	1204.67 ↗	1860	2053.80 ↗	1250	871.00 ↘
	Girls	700	1039.60 ↗	1330	1977.43 ↗	1990	1850.00 ↘

equivalent AOT score. The other is the mean AOT score itself. The first entry in each case can be considered a pre-motivational-treatments performance while the second entry can be interpreted as a post-motivational-treatments performance. To put it differently, the former score expresses a kind of <u>expectation</u> or prediction of how each group should have done on the basis of its initial level of ability while the latter score shows how each group did in <u>actuality</u>. The difference between the two scores would indicate the improvement or deterioration taken place in performance as a result of motivational treatments. The improvement or deterioration of performance in each case is indicated by the arrow appearing in the next column.

One caution seems highly appropriate at this point and that concerns the problem of regression. Even if there were no motive groups, motivational treatments, etc., and the DAT and the AOT scores were determined purely by chance there would have been some shifts upward and downward due to regression. In other words, although we have, in a sense, established equivalence of the two sets of scores, we really do not expect to find the people who are high on the DAT to be equally high on the AOT and those who are low on the DAT to be equally low on the AOT, and so on for the rest of the subjects or groups.

Figure 3 contains the same data as presented in Table 18. The left hand scale continuum represents that of the DAT while the right hand scale stands for the AOT. The twelve experimental groups of the study are placed along the two continua according to their mean performance on the two tests.

All the hypotheses of the study concerning the performance of the Ss on the AOT, namely, Hypotheses III, IV, V, and VI, can be checked with the help of Table 18 and Figure 3. In addition valuable new ideas may be obtained from the comparison of the individual groups with each other. With regard to Hypothesis IV, for example, it can be seen that all the four groups involved improved their performance when exposed to the conditions of strong affiliation motivation. This information was not available in the inferential analysis which, of course, supported the hypothesis. Hypotheses V and VI of the study can be also checked with comparable ease in Table 18 and Figure 3.

An important item of information which was lacking in the inferential type analysis was the amount of change produced in the performance of various groups as a result of motivational treatments. Tests of significance were capable only of detecting the significance or lack of significance of the differences obtained among various groups. They did not give any indication of the amount of deterioriation or improvement brought about by the motivational treatments.

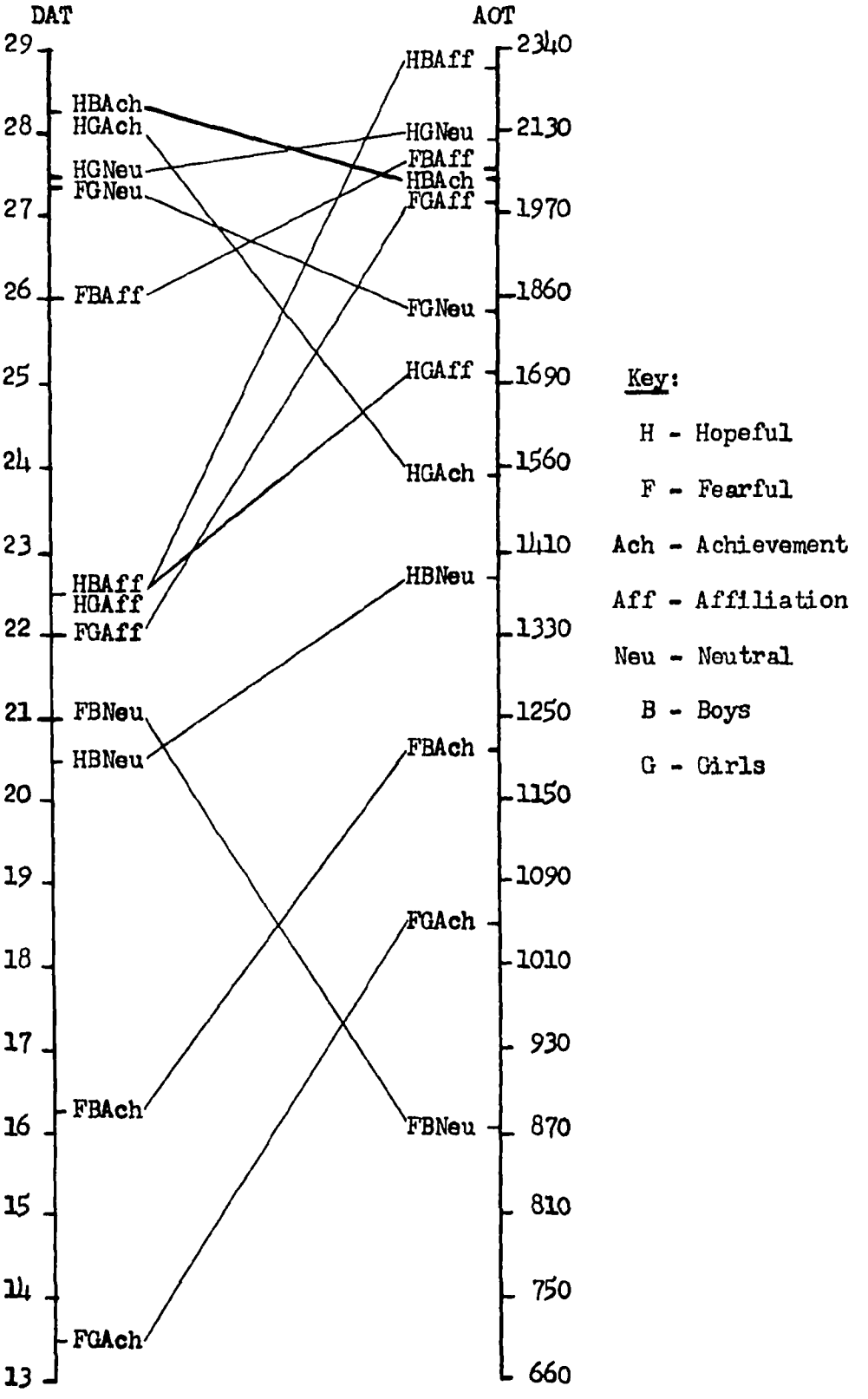

Figure 3. Graphic Comparison of Group Mean Scores on the DAT and the AOT when the DAT Scores Are Expressed in Terms of Equivalent AOT Scores

Table 18 and Figure 3 are devices by means of which one can study the magnitude of such changes.

We can, for example, look at Table 18 or Figure 3, and find the groups which improved their performance most when all the groups were considered to have the same level of initial ability. We find that the fearful girls and boys under conditions of achievement, and the hopeful boys and girls under conditions of affiliation gained most as a result of motivational treatments. On the other hand, the greatest losses or deterioriation in performance occurred in case of the hopeful girls under conditions of achievement and the fearful boys under the neutral conditions.

These examples of the types of information which one could acquire from Table 18 and Figure 3 are sufficient to justify the additional time and effort required for preparing the descriptive analysis of the data.

Discussion and Implications

One of the main purposes of this study was to simultaneously investigate several of the important variables in the area of performance and motivation so that conclusions can be drawn with regard to the relationships among those variables. The literature seems to be so diffuse in this area that it does not justify drawing such conclusions. Secondly, we had hoped that this study would have implications for the conduct of school practices and policies. The present section will be devoted to a general discussion of these two topics. We will consider some of the theoretical explanations of the findings, and will discuss the implications of these findings for the behavior of regular classroom teachers.

The first finding of the study, i.e., the one concerning the differential degree of ego-involvement of Ss in various motivational conditions, shows that certain types of motives can be aroused in high school students by verbal instructions. Specifically this was found to be true of achievement motivation as contrasted with affiliation motivation and a condition of no induced motivation. This finding can be explained in terms of the social expectations and values of the public school pupils, a great majority of whom, especially in schools and areas such as the one used in this study, come from the middle socio-economic classes. This is the social class which presumably forms the bulk of the school population at the elementary and secondary levels. Students from the lower socio-economic families with strong upward mobility can be also considered middle class individuals from this point of view. Success strivings are quite common among these groups and it is only natural that they become highly ego-involved in the task they are performing when they are given achievement instructions.

The next question would logically concern the effects of arousal of the achievement motive on the performance of high school pupils. These pupils

become emotionally involved in tasks and/or situations where a premium is put on attaining a standard of excellence because they value achievement. The question now is whether this arousal of the achievement motive would lead to an improvement of their performance. Or whether the anxiety which accompanies a strong degree of emotional involvement results in a deterioriation of their performance.

It was suggested in this study that the relationship between anxiety and performance is not a simple, one to one relationship. For one thing, the personality motive, i.e., the internal side of the total motivation, plays an important role in determining the amount of output or the quality of performance. For another thing, the complexity of the task to be performed affects the nature of this relationship. That is, the pupils who are characteristically anxious might do pretty well on a relatively simple task when highly ego-involved in a situation, whereas the same Ss might do considerably less well when given a more complex task to perform. Interpretations of the findings concerning the performance of Ss with the two opposing personality motives under various motivational treatments should throw light on these questions.

First among this group of findings was the one indicating the existence of significant differences in the performance of Ss exposed to various motivational treatments. This seems to be a rather important finding with significant implications for both education and psychology. If motivational conditions of the type used in this study, i.e., achievement, affiliation, and no induced motivation, could bring about significantly different performances on the part of the individuals who were "equal," statistically at least, with regard to the level of the ability most directly related to the performance task, it implies that one of the primary responsibilities of schools should be to explore and to provide those motivational treatments in schools which create an "ideal atmosphere" for learning and performing various types of tasks. In terms of the

immediate objectives of the school and the long-term gain of the society an "ideal atmosphere" can be defined as the one which brings the best out of the most of the pupils. It does not seem that schools have discharged this responsibility too satisfactorily in the past. Not only they have not conducted investigations of this nature but also there has ordinarily been a lag of several years between the experimental establishment of psycho-educational findings by psychologists or educationists and their actual application to school problems. This, of course, is easy to explain in terms of the self-perpetuating function of the school but such an explanation, nonetheless, does not solve the problem. It only gives a reason for it.

Our second finding with regard to the relationship between motivational factors and performance is rather closely related to the one we were considering just now. It showed that the performance of the subjects who were working under conditions of strong achievement motivation was inferior to that of Ss who, other things being equal, performed under conditions of strong affiliation motivation. An explanation for this finding is that Ss in the former group were quite strongly concerned with how well they would do on the performance task, which caused the interfering responses to lower their efficiency on the task. In case of the latter group, however, the worried concern which occupied the Ss in the first group was absent. This statement is supported by significantly higher mean emotional involvement of the pupils in the Achievement Condition on the EIQ.

Inspection of Table 18 and Figure 3 showed that all of the four experimental groups in Affiliation Condition improved their performance under that treatment. This may be taken as implying that regardless of the primary personality motive and sex of the high school pupils, as well as their level of ability, conditions of affiliation, where desire for improved interpersonal relations is at its peak, is one of the conditions most conducive to superior

performance on the part of a majority of pupils. This means that a friendly approach, a personal touch, and the other qualities which help bring about an atmosphere of affiliation and close personal relations between the teacher and the students, and among the students themselves, are some of the important attributes one should seek in teachers. Conditions of strong achievement motivation apparently cause too much anxiety in most high school pupils, which results in a deterioriation of performance, let alone being conducive to superior performance.

The superiority of affiliation conditions to a condition of no induced motivation was established in still another of the findings. It was found that Ss showed a superior performance under affiliation conditions than in a condition of no induced motivation. This finding can be explained in terms of our statement in Chapter One to the effect that total motivation to perform a task is a joint function of motive and motivation in the same individual. Since the groups under consideration were similar to each other with regard to their motives, external motivation would be the deciding factor in determining how well (or how poorly) they would perform the task. But it has already been established that conditions of affiliation have a favorable invluence upon performance, i.e., they improve the performance. Hence the finding that the performance of Ss in a condition of strong affiliation motivation was superior to performance of Ss in a condition of no induced motivation.

One of the predictions of the study, which was not confirmed by the data collected, was that where no motivation is induced externally, "hopeful" pupils will do better than "fearful" pupils. A somewhat different application of the principle that total motivation is a function of the joint effect of motive and motivation was the rationale behind this prediction. The reasoning went like this: if both motive and motivation are present and functioning in case of an individual, his performance will be decided by the type and the strength of

both factors. If, however, no particular motivational arousal is applied, as for example in the case under consideration, performance will be determined solely by motive quality and strength. Of our two groups, one, i.e., the "hopeful" group, was motivated by an approach tendency which, in and by itself, would facilitate the performance. The other group, on the other hand, was motivated by an avoidance tendency which, in and by itself, would interfere with performance. This reasoning led to the expectation that the former group would excel the latter in performance.

Since the data of the study fall in the predicted direction--associated with a probability between .10 and .15--a test of this hypothesis with a larger sample might be worth considering and may substantiate the prediction at a statistically significant level.

Another prediction of the study which was not confirmed by the data collected was that under conditions of achievement, where great emphasis is put on attaining a standard of excellence, "hopeful" subjects will do less well than "fearful" subjects.

The rationale for this prediction came from the theory of risk-taking behavior advanced by McClelland and Atkinson. The theory states that in setting their goals, the fearful individuals tend to set their goals either too high or too low. Setting the goal too low is a safe venture because they are certain that they would achieve the desired goal. This reduces their anxiety. Setting the goal too high is a speculative venture and it protects the fearful individual from anxiety and embarrassment in case of failure. In this study the situations were so structured that no data were collected with regard to setting one's level of aspiration. The task, however, was presented in a manner to make it appear very much like a speculative venture to the fearful pupils.

Investigation of Table 16 shows that the hypothesis was not confirmed due to the relatively superior performance of the hopeful boys in this Condition. This group of subjects were apparently not adversely affected by the stress-producing instructions of the Achievement Condition to any greater extent than were the fearful boys in the same Condition. While the mean AOT score of the hopeful girls is -476 compared to a mean score of -20.60 for the fearful girls, thus indicating a large difference in the direction predicted by the hypothesis, the mean AOT score of the hopeful boys is only -30.14 compared to a mean score of -44.50 for the fearful boys which actually shows a slight difference in the opposite direction. Such an outcome might have been anticipated on the basis of the data regarding the Test Anxiety Questionnaire (Table 3) which show a large sex difference in mean TAQ scores. Girls' scores run considerably higher, thus indicating perhaps that girls are more likely to suffer from strong achievement instructions than boys although the data regarding the Ego Involvement Questionnaire (Table 10) do not show a consistent trend in favor of one or the other of the two sexes in this respect.

In view of our discussion of the findings of this study, the following conclusions with particular reference to the responsibilities of teachers and other educators who are directly involved in the two-way process of teaching--and --learning seem warranted:

1. Due to the educational system of grades and examinations and the social values which a majority of high school pupils hold, teachers have a great power in inducing motivations of various types in their pupils. This power should be recognized and wisely utilized.

2. Since the level of ability of the pupils is best represented by their performance under conditions of affiliation, it is important that teachers maintain an atmosphere of friendship in the classroom. The role of such an

atmosphere would be even more important during the testing sessions or the final examinations.

3. As for achievement and affiliation motives, boys and girls do not show differential degrees of emotional involvement in the conditions designed to arouse these two motives. Teachers may, therefore, assume that members of the two sexes can be treated similarly with regard to these motives.

4. The differences in performance of the "hopeful" and "fearful" pupils, although present, are not large enough to demand an early identification and a complete differential treatment of these pupils by their teachers.

5. To the extent that research findings of the type established in this study are of value to educators, it seems highly appropriate to include this particular activity, i.e., research, among the other responsibilities of the school.

Summary

The purpose of this study was to investigate the relationships among several important motivational variables and their effects on achievement-test performance. Among the variables chosen for investigation were personality anxiety, situational anxiety, achievement motivation, affiliation motivation, and a condition of no induced motivation, hope of success, fear of failure, and degree of ego-involvement or perception by Ss of the situation they were in.

Subjects of the study were 238 Juniors (11th-graders) in high school. On the basis of the scores they made on the Test of Insight (TI) and the Test Anxiety Questionnaire (TAQ), 40 of the subjects (17 boys and 23 girls) were classified as "hopeful" and 35 (16 boys and 19 girls) were grouped as "Fearful" Ss. Three motivational conditions of Achievement, Affiliation, and Neutral were imposed on Ss through verbal instructions and the stated purposes for which the results of their performance on an Arithmetic Operations Test (AOT) were to be used. In the second Condition half an hour of sociometric procedure was also utilized.

Ss took a 60 item Arithmetic Operations Test under the Motivational Conditions. Immediately after this was over, they were given the Ego-Involvement Questionnaire (EIQ)--a self-rating five-point scale regarding their feelings and attitudes toward the test they had just taken.

Inferential type analyses of variance and covariance were applied to the EIQ and the AOT scores. Also a rather complete descriptive type analysis was done with the data obtained from the latter instrument. As a result of these analyses the following results were established:

The motivation to achieve, defined in terms of Ss' responses to a self-rating ego-involvement questionnaire, can be aroused in high school students

through verbal instructions and the stated purposes for which the results obtained from their performance on a school-like task would be used.

Performance of subjects who were working under conditions of strong achievement motivation was inferior to that of Ss who, other things being equal, were performing under conditions of strong affiliation motivation on an arithmetic operations task.

Performance of subjects in a condition of strong affiliation motivation, where great emphasis was put on improved interpersonal relations, was superior to the performance of Ss in a condition of no induced motivation.

The prediction that boys will show a greater degree of ego-involvement in achievement conditions whereas girls will show a greater degree of ego-involvement in affiliation conditions was not supported at a statistically significant level. Also unconfirmed at a satisfactory level of significance were the predictions that under neutral conditions, where no motivation is induced externally, "hopeful" pupils will do better than "fearful" pupils; and that under conditions of achievement, where great emphasis was put on attaining a standard of excellence, "hopeful" subjects will do less well than "fearful" subjects.

The theory behind the hypotheses was discussed and various explanations for and interpretations of the findings were suggested.

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APPENDIX A. THE TEST OF INSIGHT

INSTRUCTIONS

This is a test of your understanding of the reasons why people behave as they do. You will be given a characteristic behavior of each of a number of men. Your task is to explain why each man behaves as he does. Read each description and then decide what you think would usually be the reason why a man does what this man does. Decide what this man is like, what he wants to have or do, and what the results of his behavior are apt to be. If you think of more than one explanation, give only the one you think is most likely.

There are ten items in the test. You will have 30 minutes for the whole test, which gives you three minutes for writing on each item. At the end of each three-minute period the experimenter will tell you to move on to the next item.

(In actual copies of the Test of Insight, the following instructions and each following item is on a separate page.)

DO NOT TURN THE PAGE BEFORE THE EXPERIMENTER ANNOUNCES THE TIME TO START

1. Bill always lets the "other fellow" win.
2. Ed feels upset if he hears that anyone is criticizing or blaming him.
3. Fred enjoys organizing groups and committees.
4. Joe is always willing to listen.
5. Frank would rather follow than lead.
6. Tom never joins clubs or social groups.
7. John's friends can always depend on him for a loan.
8. Don is always trying something new.
9. George said, "They probably won't ask me to go with them."
10. Pete said, "I am pretty sure I can do it."

APPENDIX B. THE TEST ANXIETY QUESTIONNAIRE (HIGH SCHOOL FORM)

Many people have been interested in how students feel about tests and about taking tests. This questionnaire is designed to let you tell us how you feel about them. We know that different people may have different ideas and attitudes about the same thing. We are particularly interested in how people differ in their feelings about tests.

The value of this questionnaire will in large part depend on how frank you are in stating your opinions, feelings, and attitudes. Needless to say, your answers to the questions will be kept strictly confidential; they will not be made known to any teacher or official in the school system.

For each question there is a line on the ends of which are statements of opposing feelings. The statements refer to the question. In the middle of the line you will find the word Midpoint. This reflects a feeling which is in-between the feelings described above. You are required to put an X on the point on the line which you think best indicates the strength of your feelings about that particular question.

The midpoint is only for your guidance. Do not hesitate to put a mark on any point on the line as long as that mark reflects (shows) the strength of your feeling.

By scholastic aptitude test we mean the tests that all of you have probably taken at some time while in high school. These are usually tests for which you cannot prepare and for which you cannot study. By teacher-made test we mean the tests given to you during the term which your teacher announces in advance. These are tests covering material you have had in class; tests for which you can prepare. If we just say "tests," we mean all kinds of tests.

READ EVERY QUESTION CAREFULLY

ANSWER EVERY QUESTION

PLEASE DO TELL US HOW YOU REALLY FEEL

Answer the questions quickly. Do not spend too much time on any one question. You will have time to complete the questionnaire. Raise your hand if you have any questions and we will try to answer them. ANSWER THE QUESTIONS AS YOU FEEL.

GO AHEAD TO THE FIRST PAGE

1. When under the pressure of a testing situation, I work better than I do when on my own time.

Work better under pressure	Midpoint	Work better on my own time

2. I enjoy taking a test.

Enjoy	Midpoint	Do not enjoy

3. I prefer difficult problems given as homework to similar problems presented on an examination.

Prefer difficult problems as homework	Midpoint	Prefer difficult problems on an examination

4. Before taking a scholastic aptitude test, I feel fairly confident that I will do well.

Feel confident	Midpoint	Do not feel confident

5. After taking a scholastic aptitude test, I feel fairly confident that I have done well.

Do not feel confident	Midpoint	Feel confident

6. Before taking a scholastic aptitude test, I am aware of an uneasy feeling.

Do not feel uneasy	Midpoint	Feel uneasy

7. While taking a scholastic aptitude test, I am aware that my heart is beating faster.

Heart beats faster	Midpoint	Heart does not beat faster

8. While taking a teacher-made test, I do not perspire more than I do at other times in school.

Do not perspire	Midpoint	Perspire more than at other times

GO ON TO THE NEXT PAGE

9. I find myself thinking about other things <u>while</u> taking a test.

Do not think about other things	Midpoint	Think about other things

10. <u>While</u> taking a scholastic aptitude test, I find myself thinking about how well I am doing on it.

Do not think about how well I am doing	Midpoint	Think about how well I am doing

11. <u>Before</u> taking a scholastic aptitude test, I tend to worry.

Tend to worry	Midpoint	Do not tend to worry

12. <u>While</u> taking a scholastic aptitude test, I do not perspire more than I do at other times in school.

Do not perspire	Midpoint	Perspire more than at other times

13. <u>After</u> taking a scholastic aptitude test, I do not feel very confident that I have done my best.

Do not feel confident	Midpoint	Feel very confident

14. <u>Before</u> taking a teacher-made test, I feel fairly confident that I will do well.

Feel confident	Midpoint	Do not feel confident

15. I usually expect to do poorly on a teacher-made test.

Expect to do poorly	Midpoint	Do not expect to do poorly

16. When I feel well prepared for a course examination, I usually feel confident rather than anxious before the test.

Feel confident	Midpoint	Do not feel confident

GO ON TO THE NEXT PAGE

Remember to put a mark at any point on the line as long as that mark reflects the strength of your feeling.

17. After I have completed a scholastic aptitude test, I worry about how well I have done.

Worry about how well I have done	Midpoint	Do not worry about how well I have done

18. After taking a teacher-made test, I feel fairly confident that I have done well.

Do not feel confident	Midpoint	Feel confident

19. While I am taking a test, I find that I cannot seem to sit still.

Sit still easily	Midpoint	Cannot sit still

20. When the teacher announces that a test is going to be given, I become afraid that I am going to fail - that I will do poorly.

Become afraid that I will fail	Midpoint	Do not become afraid that I will fail

21. While taking a hard test, I find that I tend to forget facts that I thought I knew very well.

Do not forget facts	Midpoint	Forget facts

22. I am apt to aim for a perfect score on every test that I take.

Do not aim for a perfect score	Midpoint	Aim for a perfect score

23. Before taking a test, I worry about the possibility of failing it.

Do not worry about failing it	Midpoint	Worry about failing

24. While taking a scholastic aptitude test, I wonder about how well I am doing.

Do not wonder about how well I am doing	Midpoint	Wonder about how well I am doing

GO ON TO THE NEXT PAGE

25. Before taking a teacher-made test, I am aware of an uneasy feeling.

Do not feel uneasy	Midpoint	Feel uneasy

26. Before I begin to answer the questions on a scholastic aptitude test, I am aware that my heart is beating faster.

Heart does not beat faster	Midpoint	Heart does beat faster

27. Before I begin a course examination, I often feel that I cannot do well.

Feel that I cannot do well	Midpoint	Feel that I can do well

28. While taking a scholastic aptitude test, I find it difficult to concentrate on the questions because I am concerned with how well I am doing.

Find it difficult to concentrate	Midpoint	Do not find it difficult to concentrate

29. I am not very concerned with the grade I receive on a course test.

Am concerned	Midpoint	Am not concerned

30. While taking a teacher-made test, I am aware that my heart is beating faster.

Heart beats faster	Midpoint	Heart does not beat faster

31. While taking a scholastic aptitude test, I worry about the possibility of failing it.

Worry about failing	Midpoint	Do not worry about failing

32. I feel that I cannot do well before I begin a course examination only if I have not studied for it.

Feel that I cannot do well	Midpoint	Feel that I can do well

GO ON TO THE NEXT PAGE

Remember to put a mark at any point on the line as long as that mark reflects the strength of your feeling.

33. I usually try to find something on which to blame my low grades on a course examination.

Accept low grade	Midpoint	Try to find something on which to blame low grade

34. Before taking a teacher-made test, I tend to worry.

Tend to worry	Midpoint	Do not tend to worry

35. I expect myself to do better with difficult problems given as homework than with the same problems given on a course test.

Do better with the problems on a test	Midpoint	Do better with the problems given as homework

36. After I have completed a teacher-made test, I worry about how well I have done.

Worry about how well I have done	Midpoint	Do not worry

37. Before I begin to answer the questions on a teacher-made test, I am aware that my heart is beating faster.

Heart does not beat faster	Midpoint	Heart beats faster

38. After taking a teacher-made test, I do not feel very confident that I have done my best.

Do not feel confident	Midpoint	Feel very confident

39. While taking a teacher-made test, I find it difficult to concentrate on the questions because I am concerned with how well I am doing.

Do not find it difficult to concentrate	Midpoint	Find it difficult to concentrate

40. I feel that a course test result (score) shows what I really know in the subject.

Does not show what I know	Midpoint	Shows what I really know

GO ON TO THE NEXT PAGE

41. I try to improve my grades from one test to the next.

Try to improve	Midpoint	Do not try to improve

42. While taking a teacher-made test, I find myself thinking about how well I am doing on it.

Do not think about how well I am doing	Midpoint	Think about how well I am doing

43. I feel that my classroom participation shows what I know about a subject better than my examination scores.

Classroom participation shows what I know	Midpoint	Examination score shows what I know

44. While taking a teacher-made test, I worry about the possibility of failing it.

Worry about failing	Midpoint	Do not worry about failing

45. Sometimes while taking a test, my mind goes blank.

Mind does not go blank	Midpoint	Mind goes blank

46. I am very critical of myself when I do poorly on an examination.

Am very critical	Midpoint	Am not very critical

47. After a test, I am usually very interested in comparing my answers with those given by my friends.

Do not compare answers	Midpoint	Compare answers

48. Before I begin a scholastic-aptitude test, I often feel that I cannot do well.

Feel that I cannot do well	Midpoint	Feel that I can do well

GO ON TO THE NEXT PAGE

49. Even though I prepare for a course examination, I expect to do poorly on it.

Expect to do poorly	Midpoint	Do not expect to do poorly

50. After I have taken a test, I tend to forget about it and not to be very concerned about the grade that I receive.

Not concerned about grade	Midpoint	Very concerned about grade I will receive

51. While taking a teacher-made test, I wonder about how well I am doing.

Do not think about how well I am doing	Midpoint	Wonder about how well I am doing

52. I usually expect to do poorly on a course test.

Expect to do poorly	Midpoint	Expect to do well

GO ON TO THE NEXT PAGE

Please answer the questions on this page. We are asking for your name and class only because it may be necessary for research purposes. As mentioned before, all of your answers to the questions will be kept strictly confidential. Neither the questions nor your answers will ever be shown to or discussed with anyone in the school system.

Name: _____

Class: _____

Age: _____

Sex: _____

Father's occupation: _____

Mother's occupation: _____

Do you plan to go on to college?

yes no (circle the correct one)

What occupation do you plan to follow after you finish your education?

_____

THANK YOU FOR YOUR COOPERATION

APPENDIX C. THE INVENTORY OF INTERPERSONAL RELATIONSHIPS

On this page you see fifteen adjectives which are often used in describing people. They are arranged in alphabetic order. We would like you to rank-order these adjectives in terms of their degree of "attractiveness" to you. First, study the list and choose the one adjective which, when ascribed to a person, would make him most attractive to you. Write 1 beside this adjective in the "Rank" column. Next, write 15 beside the adjective which, when ascribed to a person, would make him least attractive to you. Continue working from the two extremes toward the center until you have numbered all fifteen adjectives. The last adjective you number will receive rank 8.

Adjective	Rank
Aggressive	_____
Anti-social	_____
Argumentative	_____
Conceited	_____
Cooperative	_____
Entertaining	_____
Friendly	_____
Independent	_____
Intolerant	_____
Modest	_____
Self-assured	_____
Sincere	_____
Submissive	_____
Sympathetic	_____
Timid	_____

Here we want to see how each one of you perceives himself and other members of the group in terms of the adjectives we were using a moment ago. We will start somewhere in the room and ask one of you to stand up so that others in the room can see him (or her). The person who is standing up would be Student No. 1. We want the student who is standing up and the rest of you to try to find two adjectives, from the list we just studied, which best describe him (or her). Put a plus sign (+) under these two adjectives in the proper row, that is, row 1 for Student No. 1. Next, we want you to select two adjectives which describe Student No. 1 <u>least</u> well. Put a minus sign (-) under these two adjectives in the proper row, that is, row 1 for Student No. 1.

When everybody in the group, including Student No. 1, is through rating Student No. 1 according to the procedure just described, he (or she) sits down and we will ask the student next to him (or her) to stand up. He (or she) is Student No. 2. Everybody in the group does the same things for him (or her) that we did for Student No. 1. We continue this procedure until all students in the room stand up and are rated by others and by themselves for the qualities they are most and least known to possess.

While rating each student try to remember how you feel about him (or her) on the basis of observations you have made of his behavior in your personal relations with him. The purpose is to obtain an accurate picture of the structure of interpersonal relationships among people with a fair degree of closeness or association.

Student Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Aggressive																									
Anti-social																									
Argumentative																									
Conceited																									
Cooperative																									
Entertaining																									
Friendly																									
Independent																									
Intolerant																									
Modest																									
Self-assured																									
Sincere																									
Submissive																									
Sympathetic																									
Timid																									

Student Number	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Aggressive															
Anti-social															
Argumentative															
Conceited															
Cooperative															
Entertaining															
Friendly															
Independent															
Intolerant															
Modest															
Self-assured															
Sincere															
Submissive															
Sympathetic															
Timid															

On this and the following page, the left-hand column contains students' numbers from 1 to 40 in that order. The first thing we want you to do is to write the name of each student in front of his or her number in the column headed "Full Name." Start with Student No. 1 and put his (or her) full name in the second column of the first row. Then go to Student No. 2 in the second row and write his (or her) first and family name in the second column and so on with the rest of the rows and the students.

To make sure that everybody knows everybody else's full name, we will ask each student to give us his (or her) name when his (or her) turn comes up. Let us begin now.

Student Number	Full Name	Close Personal Friends
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

Student Number	Full Name	Close Personal Friends
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		

The last thing you are asked to do is to pick those three persons in this group whom you would choose as close personal friends and put a mark (X) beside their names in the last column.

APPENDIX D. THE ARITHMETIC OPERATIONS TEST

INSTRUCTIONS

This is a test of arithmetic operations. It aims at measuring the relative speed with which you perform such operations accurately. Each item involves two or more of the four fundamental operations. There are six one-digit numbers in each item. The numbers are placed in two rows of three numbers each with appropriate signs between them to indicate the operations desired. The operations in each line should be done separately. Then the absolute difference between the results of the two rows should be figured out. This gives you a number which is your answer for that particular item. The answer is to be put in the parentheses at the right of the item. All operations should be carried on mentally, and no paper or pencil is to be used except for writing the final answer to the items. Try all items; do not skip any.

Following is an example of the kind of items making up the test:

(3 x 5) + 4

6 + 7 - 2 (8)

In the first row, 3 times 5 is 15 plus 4 gives us 19; in the second row, we have 6 plus 7, which is 13, minus 2, which gives us 11. The difference between the two results--19 and 11--is 8. This final answer (8 in this case) is put inside the parentheses.

Here is a second example for you to work out yourself before you start on the test items:

5 + 8 - 6

(4 ÷ 2) 5 (____)

BEGIN NOW AND TURN IN YOUR PAPER AS SOON AS YOU ARE THROUGH.

(4 x 4) + 6	(3 x 9) - 8
3 - (2 ÷ 1) (____)	(6 ÷ 2) + 5 (____)
(6 ÷ 2) - 2	6 + (8 ÷ 4)
(8 x 8) + 9 (____)	3 x 7 x 2 (____)
(5 x 9) - 8	6 - (2 ÷ 1)
6 - 4 + 2 (____)	9 + (1 x 5) (____)
7 - 1 + 4	(8 ÷ 2) 5
(6 x 5) - 9 (____)	7 + 5 - 3 (____)
(5 x 8) + 4	6 - 2 + 8
(6 ÷ 3) 7 (____)	(3 ÷ 1) 7 (____)
(3 x 2) + 8	9 - 3 + 8
(4 x 7) - 6 (____)	6 x 5 ÷ 2 (____)
6 x 3 ÷ 2	(3 x 9) + 4
7 + 1 - 5 (____)	6 + 8 - 5 (____)
(3 x 5) - 7	(6 x 4) + 3
4 x 6 ÷ 6 (____)	(3 ÷ 1) 9 (____)
8 - (1 x 5)	(3 - 3) 4
(9 x 2) + 7 (____)	(9 x 6) - 3 (____)
(3 x 9) - 1	(3 x 2)+ 4
7 + (5 x 4) (____)	6 + 7 - 1 (____)

$(3 \times 9) - 6$	$1 + (7 \times 2)$
$8 + (4 \div 2)$ (____)	$6 \times 5 \div 2$ (____)
$4 - (3 \div 1)$	$8 \times 3 \div 4$
$(6 \times 7) + 5$ (____)	$(6 \div 2) + 9$ (____)
$6 - 3 + 2$	$(6 \times 7) - 6$
$9 \times 4 \div 2$ (____)	$(8 \div 2) + 5$ (____)
$9 + (5 \times 2)$	$5 - 2 + 1$
$(8 \div 2) - 3$ (____)	$(7 \times 6) + 4$ (____)
$6 - 5 + 1$	$3 \times 2 \div 1$
$(2 \times 4) - 6$ (____)	$8 - 3 + 9$ (____)
$(9 \times 8) + 6$	$(4 \div 1) - 3$
$(6 \div 3) - 2$ (____)	$8 - 7 - 1$ (____)
$3 - (6 \div 3)$	$(2 \times 6) + 4$
$7 + (5 \times 9)$ (____)	$(8 \div 2)\ 7$ (____)
$(5 \times 9) - 6$	$4 + (9 \times 8)$
$5 + (8 \div 2)$ (____)	$(7 \times 4) - 6$ (____)
$8 + (4 \div 4)$	$9 + (8 \times 6)$
$(9 \times 9) - 5$ (____)	$(2 \div 1) - 1$ (____)
$4 - 1 + 8$	$(3 \times 8) - 5$
$7 \times 4 \div 2$ (____)	$9 - (8 \div 4)$ (____)

5 + 8 - 2		1 + (9 x 8)	
(6 x 5) - 9	(____)	(8 x 7) - 9	(____)
(8 ÷ 2) 9		(8 ÷ 1) - 6	
6 - 5 + 7	(____)	(4 x 3) + 5	(____)
(6 ÷ 2) - 3		(5 x 6) - 7	
(7 x 9) + 5	(____)	9 + 3 - 1	(____)
(8 ÷ 2) 9		4 + (6 x 8)	
7 - 5 + 3	(____)	(3 ÷ 1) - 2	(____)
4 x 9 ÷ 2		(8 x 1) - 3	
7 + 3 - 5	(____)	(9 x 6) + 7	(____)
5 x 9 ÷ 5		(8 ÷ 4) 7	
8 + 3 - 7	(____)	(3 x 6) + 9	(____)
6 - (3 ÷ 1)		6 x 6 ÷ 2	
(7 x 7) + 5	(____)	7 + 1 - 3	(____)
5 + 6 + 1		9 x 4 ÷ 3	
(6 ÷ 3) 6	(____)	8 + 5 - 7	(____)
9 - 3 - 6		7 + 5 - 1	
8 + 1 + 5	(____)	(8 ÷ 2) 6	(____)
5 + (2 x 7)		(5 x 6) + 3	
(8 x 4) - 6	(____)	(8 ÷ 2) - 3	(____)

APPENDIX E. THE EGO-INVOLVEMENT QUESTIONNAIRE

INSTRUCTIONS

The numbers in the first column of the answer sheet refer to the items of the questionnaire. In the row following each item number you see numbers 1, 2, 3, 4, and 5. These numbers are chosen to represent the strength or intensity of the feeling under consideration in each of the questionnaire items: 1 represents the higher extreme or the full strength of the feeling mentioned in the item; 5 represents the lower extreme or absence of such a feeling; 2, 3, and 4 represent respectively degrees between the two extremes from high to low. The following list of terms, which also head the columns of the answer sheet, will help you decide which number best represents the strength of your feeling in each case:

1. Extremely, entirely, exceptionally, everything
2. Markedly, substantially, immensely, a great deal, much
3. Moderately, noticeably, perceptibly, about average
4. Slightly, somewhat, little
5. Not at all, nothing

After reading each item, look at the proper row of the answer sheet and choose the <u>one</u> alternative which most nearly describes the strength of your feeling regarding that issue. Indicate your choice by crossing out (X) the number you choose as your number.

ANSWER ALL QUESTIONS AND DO NOT LEAVE ANY BLANKS.

REMEMBER, ALL STATEMENTS HAVE TO DO WITH TODAY'S TEST.

1. How did you like today's test?
2. How much did today's test mean to you personally?
3. How worried were you yesterday about today's test?
4. How much time did you spend studying for today's test yesterday?
5. How uneasy did you feel at breakfast today?
6. How nervous were you when you were handed the test booklet?
7. How anxious did you feel while taking the test?
8. How fast did you try to work on the test?
9. While taking the test, how worried were you about not having enough time to finish?
10. How afraid were you lest you make many mistakes on the test?
11. When taking a test some people feel they have to do their best; others just want to get done with it and don't care how well they do; still others like to do what is humanly possible without pushing themselves too hard. How concerned were you with doing well on today's test?
12. How anxious are you to get the results of this test back?
13. How strongly would your feelings be hurt if you learn that you have done very poorly on today's test?
14. How important a reflection do you feel your performance on this test would have on your personality and general intelligence?
15. How much significance do you think this test would have in forming or altering your teacher's opinion of you?
16. How important is it for you if your parents are informed about this test and how you did on it?
17. How strongly would you feel if your teacher decides to announce everybody's score on this test in class?
18. How would you like to have tests similar to the one you took today in your other courses?
19. How much better do you feel you would do on the test you just took if it were given to you a second time?

APPENDIX F. THE EIQ ANSWER SHEET

ANSWER SHEET

Questionnaire Items	Ratings				
	Extremely, entirely, exceptionally, everything	Markedly, substantially, immensely, a great deal, much	Moderately, noticeably, perceptibly, about average	Slightly, somewhat, little	Not at all, nothing
1	1	2	3	4	5
2	1	2	3	4	5
3	1	2	3	4	5
4	1	2	3	4	5
5	1	2	3	4	5
6	1	2	3	4	5
7	1	2	3	4	5
8	1	2	3	4	5
9	1	2	3	4	5
10	1	2	3	4	5
11	1	2	3	4	5
12	1	2	3	4	5
13	1	2	3	4	5
14	1	2	3	4	5
15	1	2	3	4	5
16	1	2	3	4	5
17	1	2	3	4	5
18	1	2	3	4	5
19	1	2	3	4	5

VITA

Khossrow Mohandessi was born on May 26, 1929 in Kerman, Iran. After receiving his High School Diploma from Firouz-Bahram High School in Tehran in June 1948, he entered the University of Tehran where he did undergraduate study. He received two Bachelor of Arts degrees from the Faculty of Arts and Letters, and the Teachers College of the University of Tehran in June 1951. He was an honor student all through college and was awarded a First Medal of Culture with citation by the Iranian Ministry of Education for being the top student in the graduating class of 1951.

From September, 1951 to June, 1955 he was in the employment of the Ministry of Education and taught Psychology, Education, and Literature in Normal School and High School in Rezaieh, Azarbaijan.

In July 1955 he received a U. S. Government Grant for Educational Exchange and came to the United States to pursue his graduate studies at the University of Illinois. He received his Master of Arts degree in August 1956 and continued work toward his doctorate.

He was a Research Assistant at the University of Illinois Bureau of Educational Research from September 1956 to August 1959 and taught psychological testing at the Illinois State Normal University during the Spring Semester 1959. In September 1959 he accepted a position as Project Director in the Research and Development Department of the Science Research Associates of Chicago, Illinois.